PC WORLD

LOTUS EDITION

September 1993 $3.95

CD PCs

The New Spin! 486 PCs Zoom Beyond Games With Video, Audio, and Voice

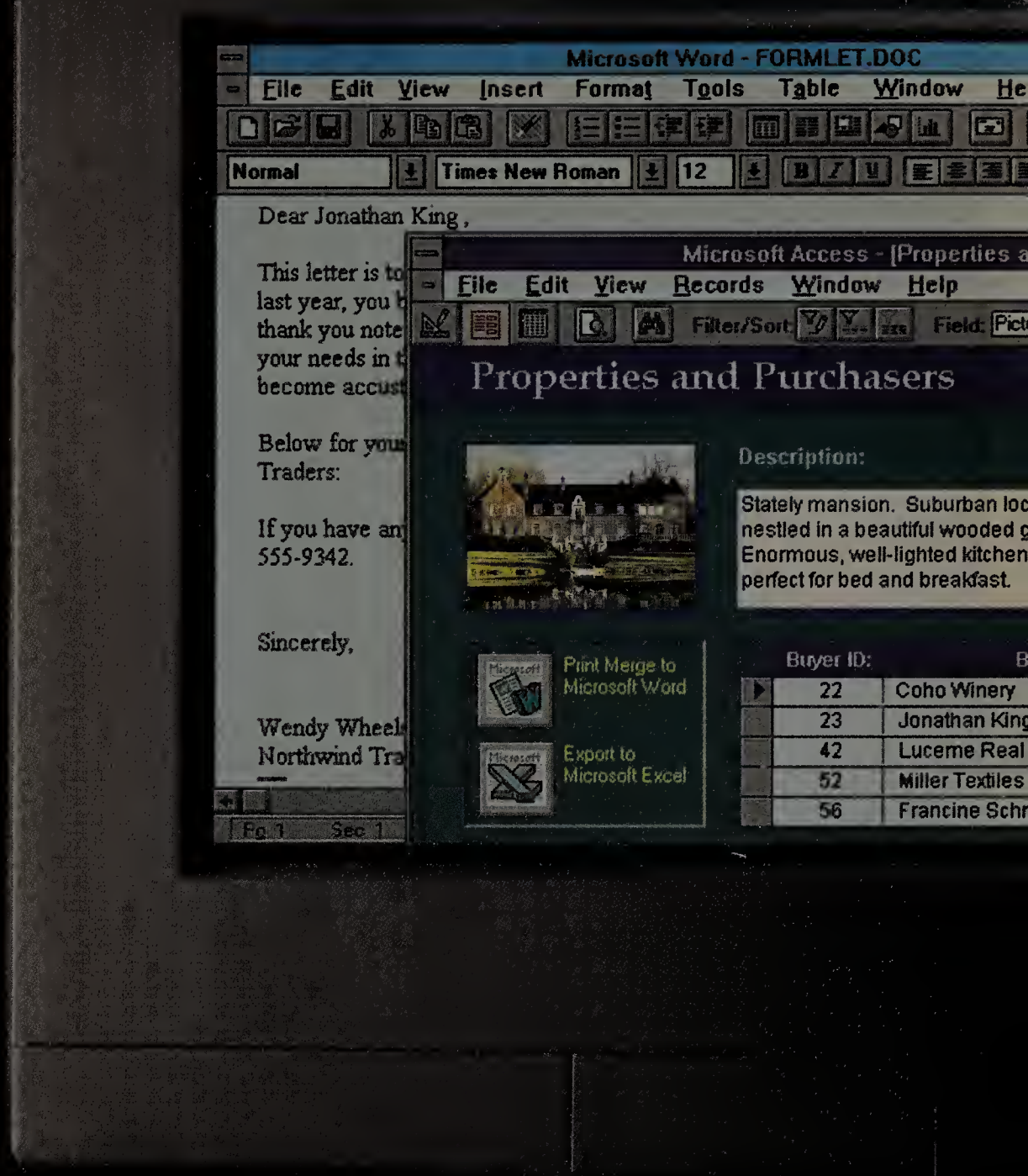
Instant Payback Software

Financial Formulas That Lotus Forgot

Safeguard Your Data! Backup Software Shoot-Out

Printed in USA

ANNOUNCING THE FIVE BEST PLACES TO WORK IN AMERICA.


Microsoft Word - FORMLET.DOC
File Edit View Insert Format Tools Table Window He
Normal
Times New Roman
12
Dear Jonathan King ,
Microsoft Access - [Properties a
File Edit View Records Window Help
Filter/Sort
Field:
Properties and Purchasers
Description:
Stately mansion. Suburban loc
nestled in a beautiful wooded g
Enormous, well-lighted kitchen
perfect for bed and breakfast.
Print Merge to Microsoft Word
Export to Microsoft Excel
Buyer ID:
22 Coho Winery
23 Jonathan King
42 Luceme Real
52 Miller Textiles
56 Francine Schr
Pg 1 Sec 1

All the best places to work are now in one place right in front of your eyes. On your computer.

Introducing The Microsoft® Office Professional for Windows.™ It's the essential business software, everything from word processing to data management. All designed to work together. Smoothly. Effortlessly.

Does software that works together really make a difference?

For openers, you can easily share text, data and graphics between applications.

Suppose you want to insert a pie chart created in Microsoft Excel into a report written in Word. Then turn the document into a riveting slide show. With the PowerPoint® presentation graphics program, it's no problem.

Does data at your fingertips make a difference?

Now imagine that you want to send ten thousand customized letters. You can quickly pull reams of data from your Microsoft Access® database files, print-merge it all into Microsoft Word and relax.

Does instantly sharing information make a difference?

It does if you want to run the new hiring policies and a summary of their financial impact by all your department heads at once.

With Mail,* you can speed the documents to twenty corner offices. Simultaneously.

The point is, whatever task you're taking on, from the simple to the challenging, you'll be able to focus on your work. Not your software.

Best of all, The Microsoft Office Professional is at your reseller now. So you could start working in a better place right away.

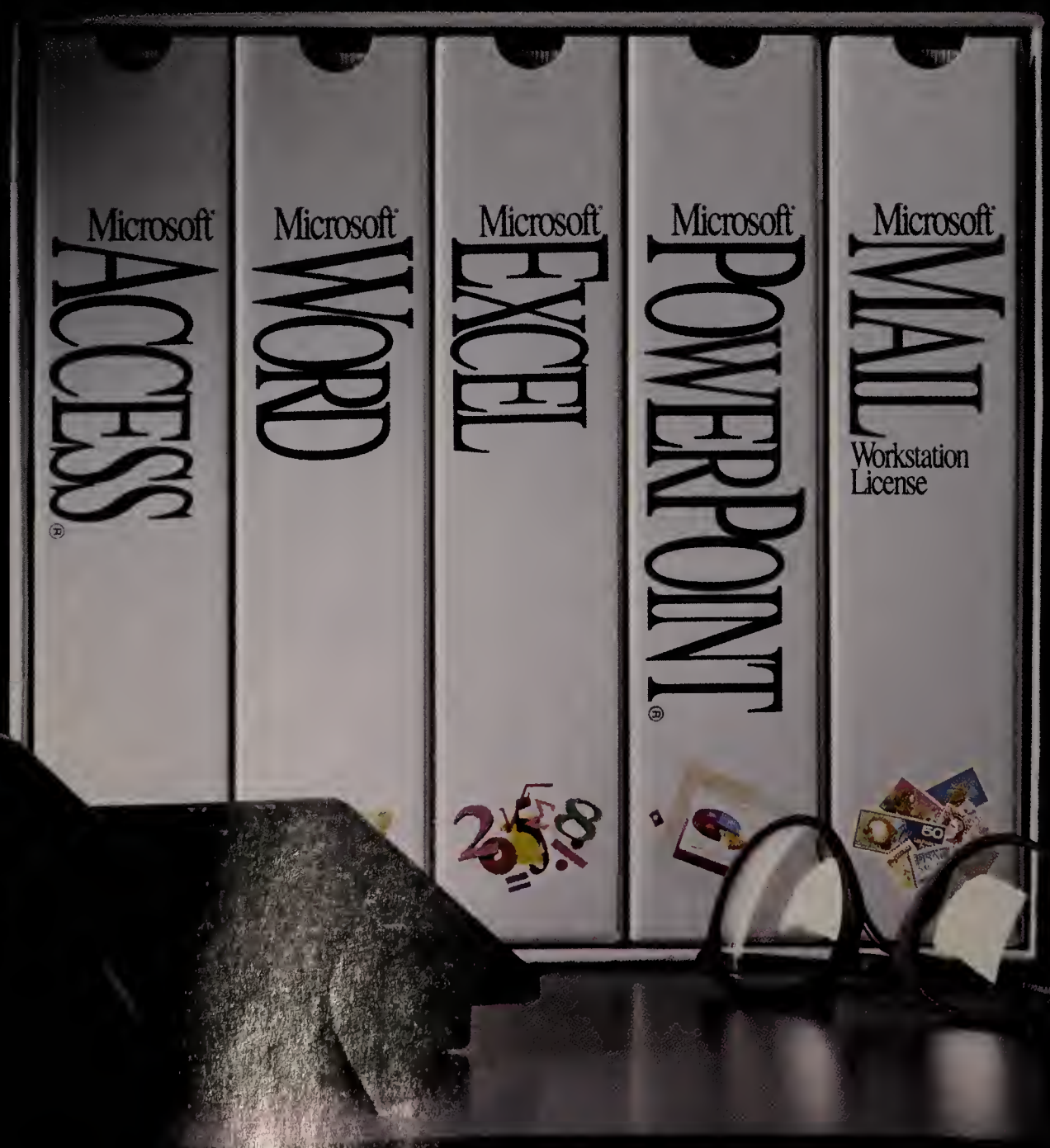
The Microsoft Office Professional includes Microsoft Excel, Word, Microsoft Access, PowerPoint and a Mail workstation license.

MICROSOFT WINDOWS

Microsoft
Making it easier

*The Mail workstation license in The Microsoft Office Professional does not include Mail software and requires a Microsoft Mail server (acquired separately) which contains all Mail software. © 1993 Microsoft Corp. All rights reserved. For more information in the 50 United States, call (800) 426-9400; customers in Canada, call (800) 563-9048; outside the U.S. and Canada, call (206) 936-8661. Microsoft, Microsoft Access and PowerPoint are registered trademarks and Windows and the Windows logo are trademarks of Microsoft Corp.

THE MICROSOFT OFFICE PROFESSIONAL.



PC WORLD

LOTUS EDITION

Cover Story

102 486 PCs With the Works
With CD ROM drives and software, sound boards, fax-modems, voice mail, and more, these glitzy 486 PCs are poised to take center stage. We pick the top 5 performers from a cast of 21 systems, from 486SX-25s to DX2-66s.

Storage

135 MO Drives: Storage for the Masses
Like the idea of slipping 128MB or 256MB of data comfortably into your pocket instead of leaving it marooned on your hard drive? Then consider a magneto-optical drive. As prices fall, one of the 12 drives reviewed here makes sense for moving your data.

Applications

148 Instant Payback Software
It's the next best thing to a free lunch: software that saves you cold, hard cash. We tracked down 22 programs—some shareware, some free—that'll cut the cost of doing business, from billing and mailing expenses to financial and legal fees.

Lotus: Get the Most From the Lotus Suite

98-L4 Editors Choice: Top Add-Ons for 1-2-3
Save yourself plenty of time and trouble by enhancing 1-2-3 with these best-of-breed add-ons and templates.

98-L13 Financial Formulas That Lotus Forgot
Put down that hand-held calculator and let these models handle three common loan calculations that ordinarily stump 1-2-3.

98-L18 Turn Your Worksheet Into a Team Player
When you're putting together budgets, release 4.0's Version Manager makes it easy for all your co-workers to register their opinions.

98-L1 Editor's Page
98-L2 News
98-L22 Improving Your Skills
98-L24 1-2-3 Tips
98-L29 Macro Basics
98-L31 Advanced Macros
98-L34 Q&A
98-L37 Suite Success
98-L38 Improvisation
277 Instant Reference Card
1-2-3 Release 4.0 for Windows

Cover photograph by Robert Cardin

Top of the News

52 The Telecommuting Imperative
Not just a good idea, telecommuting may soon be the law. Here's how to do it right.

54 Gateway, AST Notes Add Power, Color
Mobile computing gets better with five new 486 notebooks starting at $1495.

56 User Group Puts PIMs to the Test
The vote: Personal information managers really work. And every businessperson should have one.

58 PowerPC: Pentium Alternative
About half the cost of the Pentium and faster, a new CPU debuts later this year.

66 Run Your Business Without a CPA
Three Windows accounting packages take the pain out of minding your business.

p. 102

Windows

186 Windows DTP Comes of Age
Heads above Windows word processors and now head-to-head with the Macintosh, Windows desktop publishing has finally arrived. Which is best: FrameMaker 3.0, PageMaker 5.0, QuarkXPress 3.1, or Ventura Publisher 4.1?

Input Devices

213 Finding the Perfect Touch
Designed to fit the way you work, a new generation of input devices is reaching the market. Here's a comprehensive guide to the latest crop of keyboards, mice, and trackballs.

Windows/DOS

164 Backup Software: Cheap Insurance for Priceless Data
DOS 6.0's backup utility handles small jobs, but for industrial-strength backup, it just won't do. Our reviewers test nine floppy and tape backup programs with all the flexibility and automation you need to keep your data safe.

p. 135

Here's How

228 Help Line
242 Spreadsheets
248 Word Processing
252 Windows
256 Data Management
260 Publishing & Presentations
264 Communications
270 Hardware
274 Star-Dot-Star

Departments

15 In This Issue
23 Letters
29 Consumer Watch
35 Real Problems, Real Solutions
39 Business Fixtures
317 Games: Break Time
320 Home Office

Resources

12 How to Contact *PC World*
283 Fax Survey: Fax us your opinions for a chance to win a rewritable MO drive.
284 Mail-Order Shopping Guide
301 PC World Catalog
313 Advertiser Index
315 Editorial Product Index
318 Coming Up

New Products

71 Tangent Carrera 4 Workstation, AcerFormula 4000, Deskstation Evolution rPC401e/100 PCs
72 Mitsubishi FS monitors
72 Renegade 1024, 1280 Windows accelerator boards
74 Epson ActionNote 4000
74 Thunderbox Multimedia Portable
76 MoneyCounts for Windows, Payoff 2.0, Financial Workshop
78 Delrina FormFlow
78 Parsons Technology Form Creator
80 AnyView, Fantastic Recall video resolution programs
80 WordPerfect Presentations for Windows 2.0
82 Business Insight
82 PlanMaker
84 Fastback Plus 6.0, Fastback for Windows 1.1, Fastback for OS/2, Fastback Express
84 Stacker 3.1, XtraDrive 3.0, and XtraDrive Lite data compression products
86 Notework 2.0
86 RemoteWare
91 KingCOM communications utility
91 GoPrint wireless printer adapter
94 Quick Takes
98 Marketplace
Prices for popular PCs nationwide.

PC World™ (ISSN 0737-8939) is published monthly at $29.90 for one year (12 issues), $59.80 for two years (24 issues), $89.70 for three years (36 issues) by PC World Communications, Inc., 501 Second St. #600, San Francisco, CA 94107. Foreign orders must be prepaid in U.S. funds with additional postage. Add $18 per year for Canada and Mexico; add $46 per year for airmail for all other countries. Canadian GST Registration #R124669680. Second-class postage paid at San Francisco and additional mailing offices. POSTMASTER: Send address changes to *PC World*, Subscription Dept., P.O. Box 55029, Boulder, CO 80322-5029. Editorial and business offices: 501 Second St. #600, San Francisco, CA 94107, 415/243-0500. Copyright © 1993, PC World Communications, Inc. All rights reserved. The following are trademarks of PC World Communications, Inc.: *Consumer Watch, Star-Dot-Star, PC World.*

ZEOS

Want Your Computers *Now*℠? We Can Ship Today!

It's as easy as

1. Choose what ZEOS® system package you want from our ads throughout this magazine.

2. Call ZEOS at 800-554-5220 before 1 p.m. Central Time, Monday through Friday. Confirm that the system you want is a Computers *Now!*℠ package, and place your order.

3. Upon credit approval, we'll ship your system *the same day you order!*

OUR GUARANTEE TO YOU:
If we accept your order for immediate shipment and fail to ship your system under the conditions outlined, we will ship it *at our expense* as soon as it is ready.

JUST A FEW RULES:

- Orders must be for ZEOS Computers *Now!*℠ configurations. Since we continuously add to this list of configurations, *please call to confirm your system is on the list.* Any other ZEOS systems and custom configurations take slightly longer—about a week.
- Credit cards are subject to authorization.
- Orders must be received by 1 p.m. Central Time, M-F.

CALL NOW TOLL FREE
800-554-5220
24 HOURS A DAY

Circle 251 on reader service card

More power. More speed. More features than ever before—and more than you'll get anywhere else in a local bus upgradable system!

We start with a *brand-new motherboard*—one that's faster, more integrated, and gives you even more reliability. We've increased the size of our local bus hard drives (all the way to 528MB!) so your hard disk data throughput

Special Offer: We'll replace your 5¼" drive in any package with a CD-ROM player. Only $99!

Powerful, Fast And

Packages 2, 3 & 4 come with Microsoft's new ergonomic Mouse—versi

ZEOS LOCAL BUS UPGRADABLE SYSTEMS

SYSTEM HIGHLIGHTS	Package 1	Package 2	Package 3	
NOW: Hard drives up to 528MB and new lower prices!	■ ZIF socket upgradability to Pentium OverDrive CPU ■ 2MB high-speed RAM ■ 107MB local bus IDE hard drive w/32K cache ■ Windows-accelerated VL local bus video with 1MB RAM ■ Your choice of floppy drives ■ MS DOS 6.0 plus Enhanced Tools	■ ZIF socket upgradability to Pentium OverDrive CPU ■ 4MB high-speed RAM ■ 214MB local bus IDE hard drive w/128K cache ■ Windows-accelerated VL local bus video with 1MB RAM ■ Both 1.2MB and 1.44MB floppy drives ■ MS DOS 6.0, Tools, Windows & new Microsoft Mouse, plus choice of either Ami Pro, Freelance, Improv, Organizer, or the hot new Lotus 1-2-3 version 4.0!	■ ZIF socket upgradability to Pentium OverDrive CPU ■ 8MB high-speed RAM ■ **426MB,** 13ms local bus IDE hard drive w/128K cache ■ Windows-accelerated VL local bus video with 1MB RAM ■ Both 1.2MB and 1.44MB floppy drives ■ MS DOS 6.0, Tools, Windows & new Microsoft Mouse, plus choice of either Ami Pro, Freelance, Improv, Organizer, or the hot new Lotus 1-2-3 version 4.0!	■ Z to ■ 1 ■ 5 ID ca ■ W V 1 ■ B fl ■ M & p P O L
486SX-25	**$1395**	**$1695**	**$1995**	
486SX-33	**$1495**	**$1795**	**$2095**	
486DX-33	**$1695**	**$1995**	**$2295**	
486DX2-50	**$1795**	**$2095**	**$2395**	
486DX2-66	**$1895**	**$2195**	**$2495**	

STANDARD WITH EVERY ZEOS LOCAL BUS UPGRADABLE:

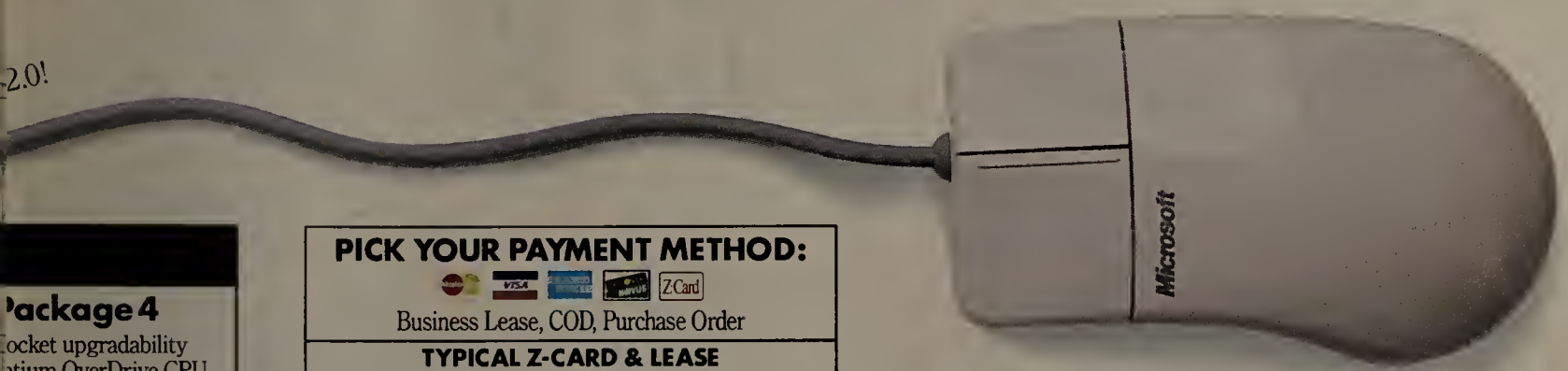
- RAM expandable to 64MB on the motherboard.
- Upgradable processors that let you upgrade to Intel's Pentium OverDrive architecture.
- Zero Insertion Force (ZIF) socket makes upgrading easy.
- 14" ZEOS color SVGA non-interlaced monitor, .28mm dot pitch.
- Two serial ports and one parallel port integrated on the motherboard.
- Flash BIOS for easy upgradability.
- Eight expansion slots: two VESA local bus, five 16-bit and one 8-bit.
- ZEOS six-bay desktop case.
- Two cooling fans for increased reliability and product life.
- High-capacity 200W power supply with built-in suppression; switchable between 115/230V.
- Socket for inexpensive optional on-board SCSI.
- Shadow RAM support.
- ZEOS 101-key Reduced Size (RS) keyboard.
- FCC Certified Class B; UL Listed.
- Complete ZEOS Customer Satisfaction Package.

intel inside

is faster than ever before. Even better, we've taken one of the two VESA local bus slots (which can also be used for standard 16-bit cards) and added a screaming local bus video card...for Windows performance that *"blows all competitors away"* (PC Magazine).

So that you can easily upgrade your system as new technology is developed, we include such features as CPU upgradability to Intel's Pentium™ OverDrive™; a Zero Insertion Force (ZIF) socket; Flash BIOS for easy BIOS upgradability, and room to expand as well—with eight expansion slots and plenty of drive bays. With ZEOS local bus upgradables, you're investing in a bright future!

Loaded With Features.



2.0!

Package 4

ocket upgradability
ntium OverDrive CPU
3 high-speed RAM
MB, 12ms local bus
hard drive w/256K
e
ows-accelerated
ocal bus video with
RAM
1.2MB and 1.44MB
y drives
OS 6.0, Tools, Windows
w Microsoft Mouse,
choice of either Ami
Freelance, Improv,
nizer, or the hot new
s 1-2-3 version 4.0!

$2495
$2595
$2795
$2895
$2995

PICK YOUR PAYMENT METHOD:

Business Lease, COD, Purchase Order

TYPICAL Z-CARD & LEASE MONTHLY PAYMENTS

SYSTEM PRICE	Z-CARD	LEASE
$1395	$39	$59
$1495	$42	$63
$1695	$47	$61
$1795	$50	$65
$1895	$53	$69
$1995	$55	$72
$2095	$58	$76
$2195	$61	$79
$2295	$64	$83
$2395	$67	$87
$2495	$69	$90
$2595	$72	$94
$2695	$75	$98
$2795	$78	$101
$2895	$80	$105
$2995	$83	$108

Z-Card payments based on 1/36 of system price, minimum payment $30. Monthly interest excluded. Lease payments based on a 36-month lease, 10% purchase option.

AWARD-WINNING REPUTATION.

We're the only company to win *PC Magazine's* Readers' Choice for Service & Reliability—for both desktops and notebooks—*twice!*

Plus nine times *PC Magazine* Editors' Choice! And ZEOS has twice won *PC World's* Best Buy, *Computer Shopper* readers' #1 Best Buy, and *Info World's* Buyer's Assurance Award.

TOLL-FREE TECH SUPPORT.

We're here for you 24 hours a day, 365 days a year, and always a toll-free phone call away.

WARRANTIES & GUARANTEES.

All ZEOS systems come with a One Year Limited Warranty, Express Parts Replacement Policy and a 30-Day Money-Back Guarantee. You're going to be very satisfied. *We guarantee it!*

FAVORITE OPTIONS

15-INCH MONITOR UPGRADE
SVGA non-interlaced, 1024x768, flat screen **$95**

VERTICAL CASE UPGRADE
Includes ten bays **$95**

DIAMOND VIPER VIDEO CARD
Combine it with the ZEOS motherboard and you'll get speed that *PC Magazine* said "blew all competitors away"!
Includes 1MB VRAM **$149**
with 2MB VRAM **$249**

INTERNAL CD-ROM DRIVE $199

ARCHIVE 51250A INTERNAL TAPE BACKUP
80 to 250MB (with compression), includes EZTape for DOS **$249**

ADAPTEC SCSI CONTROLLER CHIP $49

CALL NOW TOLL FREE
800-554-5220
24 HOURS A DAY

ZEOS INTERNATIONAL, LTD.

Fax Orders: 612-633-1325, Government: 800-245-2449, TDD Orders: 800-228-5839, Outside U.S. and Canada: 612-633-6131. MasterCard, VISA, Am Exp, Discover, Z-Card,™ COD and Leasing programs. Open 24 Hours a Day, 365 Days a Year!

Purchase orders from Fortune 1000 companies, governments and institutions subject to approval. Leasing programs available. All prices and specifications are subject to change without notice. Please call to confirm pricing, specifications and warranty details. All products and company names are trademarks or registered trademarks of their respective holders. The Intel Inside logo is a registered trademark of Intel Corporation. ©1993 ZEOS International, Ltd., 1301 Industrial Blvd., Minneapolis, MN 55413 USA. ZEOS is a publicly traded company (NASDAQ symbol: ZEOS). UPGR-PCW-9309

Circle 251 on reader service card

The ZEOS® Conte
That Great Things Co

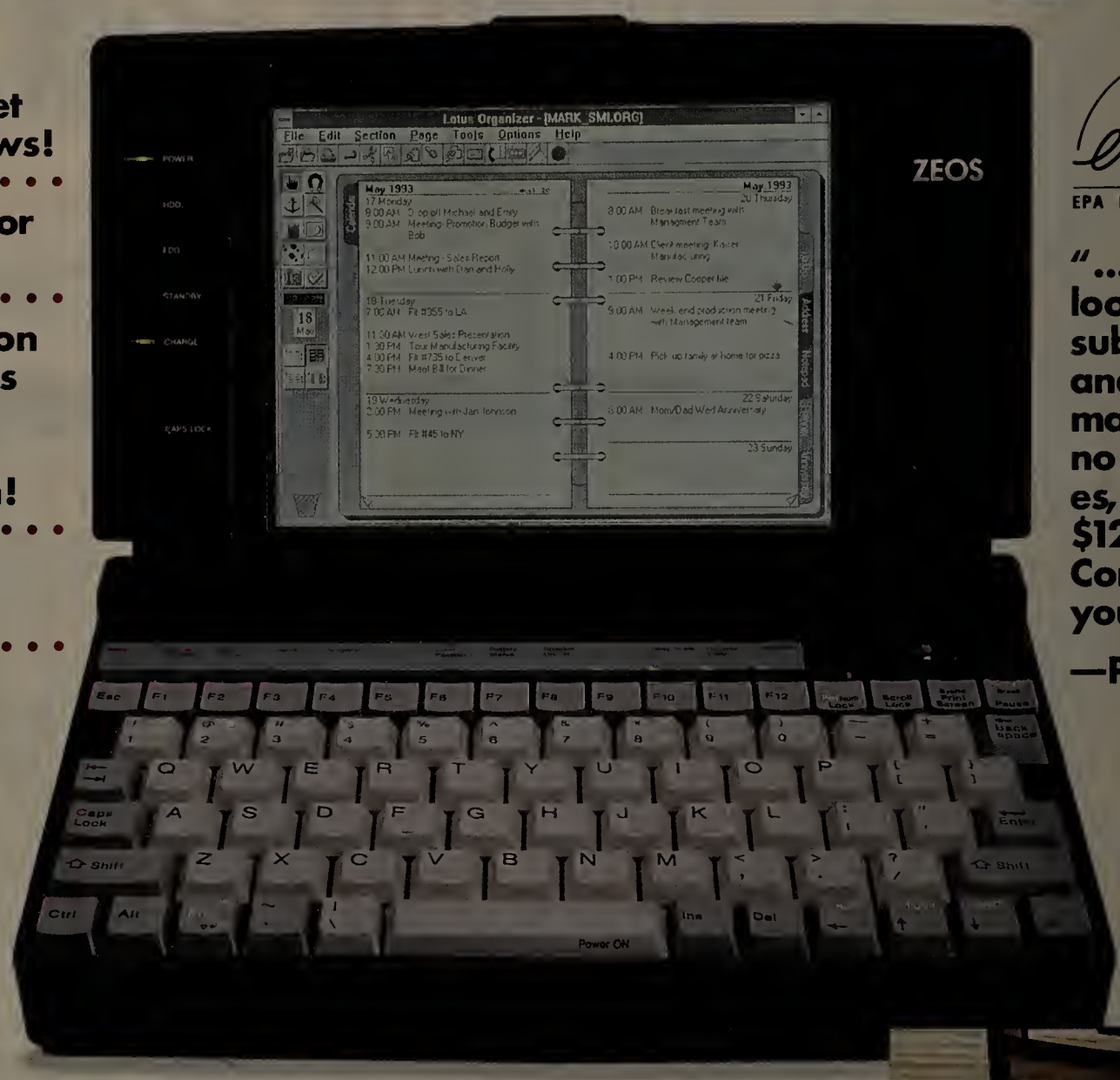
Less than 4 pounds, yet runs Windows!

Intel 386SL or 486SL CPU

486SL version has local bus video for Windows acceleration!

VGA backlit screen

Built-in trackball



EPA POLLUTION PREVENTER

"...if you're looking for a subnotebook and want to make next to no compromises, then the $1295 ZEOS Contenda is your best bet."

—PC Week

Smaller than a notebook. Lighter than your briefcase. The ZEOS Contenda subnotebook is proof that great things come in small packages...including plenty of power to run Windows wherever you go!

We start with a smart Intel SL processor —your choice of either a 386SL-25 or new 486SL-25. You'll find that the Contenda's processor extends your battery life significantly—because it's intelligent enough to power-down the memory, disks, modem and more when they're not in use.

What's more, the Contenda's features make it a pleasure to use. Features such as a high-resolution backlit screen that's crisp and vibrant. A built-in trackball so you won't have to tote a mouse around. And with a standard 80MB hard drive, memory up to 10MB and weight of less than four pounds, it's one powerful, portable Windows workhorse!

nda™. Solid Proof me in Small Packages.

PACKAGE 1

386SL Contenda: $1295
Lease: $59/month
- 2MB RAM
- 80MB IDE hard drive

486SL Contenda: $1795
Lease: $66/month
- 4MB RAM
- 80MB IDE hard drive

PACKAGE 2

386SL Contenda: $1595
Lease: $62/month
- 4MB RAM
- 80MB IDE hard drive
- External 3.5" floppy disk drive
- MS-DOS 6.0
- Microsoft Windows 3.1
- Lotus Organizer

486SL Contenda: $1995
Lease: $73/month
- 4MB RAM
- 80MB IDE hard drive
- External 3.5" floppy disk drive
- MS-DOS 6.0
- Microsoft Windows 3.1
- Lotus Organizer

FAVORITE OPTIONS

ACCESSORIES
External 3.5" floppy disk drive **$99**
Extra battery **$99**
External charging stand **$79**
Custom leather carrying case **$129**
Custom nylon carrying case **$79**
DC-DC adapter **$49**

MEMORY UPGRADES
386SL: 2MB to 4MB upgrade **$99**
386SL: 4MB to 10MB upgrade **$561**
486SL: 4MB to 8MB upgrade **$198**

COMMUNICATION
FastLynx File transfer software **$79**
Internal 2400 bps modem with 9600 bps send fax and 4800 bps receive fax **$99**
Xircom Ethernet adapter (10BT or Coax) **$349**

PACKAGE 3

386SL Contenda: $1795
Lease: $69/month
- 4MB RAM
- 80MB IDE hard drive
- External 3.5" floppy disk drive
- Custom nylon carrying case
- Extra battery
- Internal 2400 bps modem with 9600 bps send fax and 4800 bps receive fax
- MS-DOS 6.0
- Microsoft Windows 3.1
- Lotus Organizer

486SL Contenda: $2395
Lease: $87/month
- 8MB RAM
- 80MB IDE hard drive
- External 3.5" floppy disk drive
- Custom nylon carrying case
- Extra battery
- Internal 2400 bps modem with 9600 bps send fax and 4800 bps receive fax
- MS-DOS 6.0
- Microsoft Windows 3.1
- Lotus Organizer

AWARD-WINNING SERVICE & SUPPORT

We're the only company to win *PC Magazine*'s Readers' Choice for Service and Reliability—for both desktops and notebooks—*twice!*

TOLL-FREE TECH SUPPORT AT ANY HOUR.

We're here for you 24 hours a day, 365 days a year, and always a toll-free phone call away.

WARRANTIES & GUARANTEES.

All ZEOS systems come with a One Year Limited Warranty, Express Parts Replacement Policy and a 30-Day Money-Back Guarantee. You're going to be very satisfied. *We guarantee it!*

STANDARD WITH EVERY ZEOS CONTENDA:

- 25MHz 80386SL or 80486SL microprocessor.
- RAM expandable to 8MB for 486SL, 10MB for 386SL.
- IDE hard drive.
- Display: 640 x 480 VGA backlit, .23 dot pitch, Sharp 7.4" diagonal, up to 64 shades.
- 256K (386SL version) or 512K (486SL version) video RAM.
- 486SL version includes 3.3v technology for added battery life, PI local bus for Windows acceleration, high-speed floppy drive controller.
- Supports simultaneous display with an external SVGA color monitor.
- Replaceable and rechargeable NiMH battery.
- 80-key keyboard with embedded numeric keypad and easy-to-use built-in trackball.
- One serial port, one parallel port, one video port, and ports for optional internal fax/modem and external floppy drive.
- AC adapter with full range from AC110-240V to DC.
- Power Management: Fully featured, including De-turbo, programmable Standby features and Suspend to disk.
- Password feature built-in ROM.
- 9.7" x 6.1"; 3.9 lbs.
- FCC Certified Class B; UL Listed.
- Complete ZEOS Customer Satisfaction Package.

CALL NOW TOLL FREE
800-554-5220
24 HOURS A DAY

Fax Orders: 612-633-1325, Government: 800-245-2449, TDD Orders: 800-228-5839, Outside U.S. and Canada: 612-633-6131. MasterCard, VISA, Am Exp, Discover, Z-Card,™ COD and Leasing programs. Open 24 Hours a Day, 365 Days a Year!

Purchase orders from Fortune 1000 companies, governments and institutions subject to approval. Leasing programs available. All prices and specifications are subject to change without notice. Please call to confirm pricing, specifications and warranty details. All products and company names are trademarks or registered trademarks of their respective holders. The Intel Inside logo is a registered trademark of the Intel Corporation. The Energy Star emblem does not represent EPA endorsement of any product or service. ©1993 ZEOS International, Ltd., 1301 Industrial Blvd., Minneapolis, MN 55413 USA. ZEOS is a publicly traded company. (NASDAQ symbol: ZEOS). SN-PCW-9309

ZEOS® INTERNATIONAL, LTD.

Circle 260 on reader service card

Get in touch when your system board is ready to meet its maker.

IBM PS System Board Repair Service

- Factory direct
- Post-warranty service
- Original parts
- One or five-day service

Call today for more information:

1(800)759-6995

IBM®

Circle 142 on reader service card

PC WORLD

EDITOR IN CHIEF Philip Lemmons

EXECUTIVE EDITOR Russell Glitman
MANAGING EDITOR Cathryn Baskin
ART DIRECTOR Robert Kanes

SENIOR EDITORS
Features Steve Fox
User Issues Roberta Furger
Reviews Owen Linderholm

EAST COAST EDITOR Randy Ross (617/422-8020)
SENIOR EDITOR, NEWS Joe Abernathy (713/781-6751)

EDITORIAL
Assistant Managing Editor Anne Kandra
Technical Editor Karl Koessel
Associate Editors Rex Farrance, Bryan Hastings, Lincoln Spector
Assistant Editors Jeff Bertolucci, Michael Desmond, Anita Hamilton, Dan Miller, Melissa R. Riofrio, Christina Wood
Assistant Technical Editor Shane Rau
Assistant Editor, East Coast Laurianne McLaughlin
Editorial Assistant John Goddard
Editorial Interns Sarah Klein, Gordon Ung
Fact Checker Caroline Jones

Copy Chief Richard Johnson
Senior Copy Editors Barbara Lewis, Marla Miyashiro, Peggy Nauts
Copy Editors Nina Barringer, Kimberly Stein
Electronic Typographer Henry Pham

Assistant to the Editor in Chief Cynthia Grossman
Administrative Assistant Ken Blaylock

Business Manager Scott Danish
Librarian Stella Chan

ART & DESIGN
Associate Art Director Greg Silva
Senior Designers Barbara Adamson, Laura Guerin
Senior Design Associates Tim J Luddy, Carolyn Perot
Designer/Infographics Jeff Berlin
Assistant Designer/Infographics Hope Winslow
Production Artist Marlene Tobias

CONTRIBUTING EDITORS
Anita Amirrezvani, Steve Bass, TJ Byers, George Campbell, Scott Dunn, Thom Foulks, Bronwyn Fryer, Brett Glass, Michael Goodwin, Judy Heim, Richard Jantz, Eric Knorr, Robert Luhn, Celeste Robinson, Richard Scoville, Gene Smarte, Ralph Soucie, Scott Spanbauer, Daniel Tynan, John Walkenbach

Founder David Bunnell
Founding Editor Andrew Fluegelman

PC WORLD ONLINE
Director Jim Moody (America Online, PCW JimM; CompuServe, 71154,212)
Acting Manager Dennis Sheridan (America Online, PCW Dennis; CompuServe, 71154,362)

PC WORLD TEST CENTER
Director Gregory Smith
Senior Performance Analysts Dean Andrews, Thomas Grubb
Performance Analysts Ulrike Diehlmann, Susan Silvius
Coordinator Dawn Furseth

USER GROUP ADVISORY BOARD
Steve Bass, Pasadena IBM Users Group; Roger Bender, Microcomputer Managers Association; Jack Bolton, Atlanta PC User's Group (APCUG); Brian Camenker, Boston Computer Society; Rollie Cole, APCUG; Paul Curtis, APCUG; Mary Dolce, Chicago Computer Society; Sandy Frunzi, Las Vegas PC User Group; Al Harrison, Houston Area League PC Users; David Hoffman, NYPC; Joseph Rigo, NYPC; Irving Samuels, Capital PC User Group

PRESIDENT Patrick Kenealy

PUBLISHER Richard J. Marino

PC WORLD LOTUS EDITION
Executive Editor Eric Bender
Senior Associate Editors Richard Cranford, Carrie Thomas
Associate Editors Cynthia G. Fitzgerald, Ann Kremers, Andrea C. Powers, Carol White
Assistant Editor Catherine Kenny

LOTUS EDITION MAILING ADDRESS
77 Franklin St. #300, Boston, MA 02110
Phone: 617/482-8470 Fax: 617/426-0235

LOTUS ALLIANCE PRODUCTS DIVISION
Vice President Jean Criss
Marketing Director Elizabeth Tucker
Art Director Melissa Holmes
Account Executive Wayne Silverman
Marketing Specialist Tuesday Thomas

LOTUS NEWSLETTER DIVISION
Editor in Chief Jennifer J. Smith
Production Manager Andrew Ochrymowych

MULTIMEDIA WORLD SPECIAL SECTION
Publisher Jonathan Epstein
Editor in Chief Don Menn
Art Director Adrian Morgan
Senior Editor, News and Reviews Paul Worthington
Copy Editor Cynthia Klein
Associate Publisher Patricia Navone
Western Advertising Sales Manager A. G. Germano (415/978-3221)
Eastern Advertising Sales Manager Isabelle Kane (617/361-4246)
Sales Assistant Janett Kennedy (415/978-3208)
Market Development Manager Damon A. Dean
Circulation Promotions Manager Thomas Hsieh, Jr.
Office Manager Paul Fitzgibbon

MULTIMEDIA WORLD MAILING ADDRESS
501 Second St., San Francisco, CA 94107
Phone: 415/281-8650 Fax: 415/281-3915
America Online: MMWorld
CompuServe: 75300,2503
MCI Mail: MPC Prodigy: KAMD36B

Two Thumbs Up For ALR's EVOLUTION V

Winner

"Best of Show, Spring Comdex, 1993"

BYTE Magazine - May, 1993

"ALR has built a screamer."

Computer Shopper - May, 1993

"Expect to hear a lot more about the EVOLUTION V... ALR did its homework when it came to optimization."

Computer Shopper - May, 1993

Now Shipping!

intel inside pentium PROCESSOR

EVOLUTION V
System Board Technology

1. 60-MHz Pentium Processing
   Supports Pentium Write-Back Mode
2. 8-MB RAM
   (Expandable to 128-MB);
   True 64-bit Data/Memory Path
3. Integrated 256-KB Write-back Cache
4. Integrated MULTUS
   (Multi-seeking) IDE Controller
5. Six 32-bit ISA Expansion Slots
6. 3 VESA VL Local Bus Slots

System Also Includes: Six DriveBays & 200Watt Power Supply

Model 170DWM

Pentium Processor Power from just $2495

The ALR EVOLUTION V

MODEL 1
Powerful Pentium Processing plus the Advanced Features shown at left -- amazing power for such a low price **$2495**

MODEL 170DWM
COMPLETE SYSTEM
includes above features plus: 170-MB IDE Hard Disk high-performance local bus video adapter14" SVGA monitor MS-DOS 6.0, MS-Windows 3.1 and Mouse **$3595**

MODEL 340DW
includes Model 1 features plus 340-MB IDE Hard Disk, MS-DOS 6.0, MS-Windows 3.1 and Mouse **$3445**

Also Shipping
50-MHz i486DX/2 Sytems starting at $1579

5 YEAR 15 MONTH warranty

Low Cost 3 Year *On-Site Service Now Available* (Call for Details)

For more information please call

800.444.4ALR

ALR can be reached on CompuServe -- GOALR INC

ALR®

Advanced Logic Research, Inc.

9401 Jeronimo Irvine, CA 92718
(714) 581-6770 FAX: (714) 581-9240

"With memory and data paths wide enough to support the new chip, the EVOLUTION VQ becomes an excellent file server..."

Computer Shopper - May, 1993

The ALR EVOLUTION VQ/60

MODEL 8CM
ALR's high performance Quadflex Architecture, state-of-the-art Pentium Processing, tremendous expandability, -- the ultimate network server **$4495**
with 66-MHz Processor ... $4795

MODEL 480-16CVM
includes above features plus: 16-MB RAM total480-MB (Dual 240-MB) IDE Hard Disk ALR MULTUS™ multiseeking disk interfaceWD 90C31-based Local Bus Video Adapter **$5995**
with 66-MHz Processor ... $6295

MODEL 1.2-16CVS
includes Model 8CM features plus 16-MB RAM total1.2-GB SCSI Hard Disk with 32-bit SCSI Local Bus master controller WD 90C31-based Local Bus Video Adapter **$7595**
with 66-MHz Processor ...$7895

Some systems shown with optional monitors. Prices and configurations are subject to change without notice. Prices based on U.S. dollars. ALR is a registered trademark of Advanced Logic Research, Inc. Intel Inside logo is a trademark of Intel, Corp. All other brand and product names are trademarks or registered trademarks of their respective owners. ©1993 by ALR

Circle 9 on reader service card

NetAdvantage™
PSC Four Port Print Server Card

Accelerate Printing on NetWare LANs

NetAdvantage PSC is speed:
1.2 Mbps per port (120,000 cps per port).

NetAdvantage PSC is flexibility:
Using twisted pair cabling, parallel printers can be up to 600 feet away.

NetAdvantage PSC is power:
Can actively log and serve 8 file servers and 64 print queues.

PROTEC
Tel: (514) 630-5832 • Fax: (514) 694-6973

Sharing PERIPHERALS IS OUR BUSINESS™

Toll Free: 1-800-363-8156
Extension: 245

All trademarks are properties of Protec Microsystems Inc.

Circle 198 on reader service card

HOW TO CONTACT PC WORLD

MAIL

PC World Editorial, 501 Second St. #600, San Francisco, CA 94107
Phone: 415/243-0500 **Fax:** 415/442-1891
America Online: keyword PC WORLD
CompuServe: GO PWOForum
MCI Mail: PC World Editorial or 179-3813
Internet: 1793813@mcimail.com

PC WORLD ONLINE

You can contact the editors by sending electronic mail to the PC World Online areas of America Online and CompuServe. The areas feature current and back issues of *PC World*, *PC World Lotus Edition*, and the *Multimedia World* special section, a software library, and message boards and conferences.

To obtain a free America Online starter kit, call 800/827-6364.

To join PC World Online on CompuServe, set your communications software to 7 data bits, even parity, and 1 stop bit. To find out your local access number, dial 800/346-3247 (modem) and type **Phones** at the Host Name ID prompt. Fill in the requested information. Then dial again using the local access number, and once connected, press **<Enter>**. Fill out the screen as follows:
Host Name: **CIS** User ID: **177000,5605**
Password: **COMPUSERVE** Agreement#: **PCWORLD**
Serial Number: **<Enter>**

If you require further assistance, or if you would like to receive the *PC World* customized interface, call CompuServe customer assistance at 800/848-8990, 800/635-6225 in Canada. You may order membership kits for sign-up after business hours by calling 800/848-8199.

LETTERS TO THE EDITOR

Send editorial correspondence electronically to the Message Board on PC World Online or mail it to Letters to the Editor at *PC World*. Be sure to include your name, city, and state. We reserve the right to edit letters.

CONSUMER WATCH

Send consumer-related questions and complaints to Roberta Furger, *Consumer Watch*, at the above address; to the Consumer Watch forum on PC World Online; or to MCI Mail, PC World Editorial.

REAL PROBLEMS, REAL SOLUTIONS

Send article ideas—including a brief outline of your company, job, problem, and solution as well as your name, address, and phone number—to *Real Problems, Real Solutions*, at the above address; or send it electronically to the Real Problems, Real Solutions forum on PC World Online; 415/326-4304 (fax); or call us at 415/978-3212. *PC World* pays $300 per published column.

HERE'S HOW, HOME OFFICE

Send questions electronically to the appropriate forum on PC World Online (for example, send *Help Line* questions to the Help Line forum) or to the online address below, or mail them to columnists at *PC World*.

Contact editors at the following addresses:
Help Line: CompuServe, 74055,412; MCI Mail, 179-3813; Internet, 1793813@mcimail.com
Spreadsheets: CompuServe, 72341,2727; MCI Mail, 357-4517
Word Processing: CompuServe, 71571,222; MCI Mail, GCAMPBELL
Windows: CompuServe, 74055,412
Data Management: CompuServe, 74055,412
Publishing & Presentations: MCI Mail, RJANTZ; mail make-over candidates, preferably clean and unfolded, to *Publishing & Presentations, Make-Overs*, at *PC World*
Communications: CompuServe, 75300,713; MCI Mail, 312-7737; GEnie, JUDY.HEIM; Internet, 3127737@mcimail.com
Hardware: MCI Mail, 459-7102
Star-Dot-Star: CompuServe, 74055,412; Internet, rogue@well.sf.ca.us
Home Office: CompuServe, 71333, 310

READER SUBMISSIONS

Send us your technical problems and solutions. *PC World* pays $25 for each *Power Tip* we publish, $200 to the user group featured in *User Group Tips*, $25 to $200 for *Star-Dot-Star* items, $50 for questions used in the Here's How section, and $200 for items made over in *Publishing & Presentations*. Keep submissions brief (*Power Tips* to 100 words or less); accepted submissions will be acknowledged by payment.

NEW PRODUCT ANNOUNCEMENTS

Address hardware and software press releases to New Products or call 415/978-3212.

SUBSCRIPTION SERVICES, ADDRESS CHANGES

For *PC World, PC World Lotus Edition*, and the *Multimedia World* special section: Call toll-free 800/234-3498 (303/447-9330 in Colorado and Canada), or write Subscriber Services, P.O. Box 55029, Boulder, CO 80322-5029. To place new orders, call 800/825-7595.

REPRINTS AND PERMISSIONS

You must have permission before reproducing any material from *PC World, PC World Lotus Edition*, and the *Multimedia World* special section. To quote from or reprint any portion of any article or use artwork or photographs from the magazine, send a written request to *PC World*, Reprints and Permissions, 501 Second St. #600, San Francisco, CA 94107; include a phone number for a fast response. To order reprints of your company's editorial coverage in *PC World* or *PC World Lotus Edition*, call 415/978-3162. To order reprints of your company's editorial coverage in the *Multimedia World* special section, send a written request including your address and phone number to Paul Fitzgibbon, *Multimedia World* Special Section, 501 Second St., San Francisco, CA 94107, or call 415/267-1755.

Only an Intel SatisFAXtion® Modem comes bundled with all this.

Intel's line of SatisFAXtion® Modems gives you the foremost in faxmodem technology—and the accolades of eight of the biggest industry publications—in every box.

In fact, the SatisFAXtion Modem/400 series has won more awards than any other faxmodem.

And for good reason. The SatisFAXtion Modem offers:

- An exclusive smart buffering feature, so all your data gets to you.
- Smart Line Sharing, a feature that distinguishes between voice, data and fax calls, so you only need one phone line.
- A separate microprocessor that lets you work in other applications while you fax—it's like having two computers.
- Free fax and data software for Windows* and DOS.

WE MAKE COMPUTERS WORK HARDER.
Find out more. Dial ext. 283.
1-800-538-3373

Now get Quicken* bundled free.

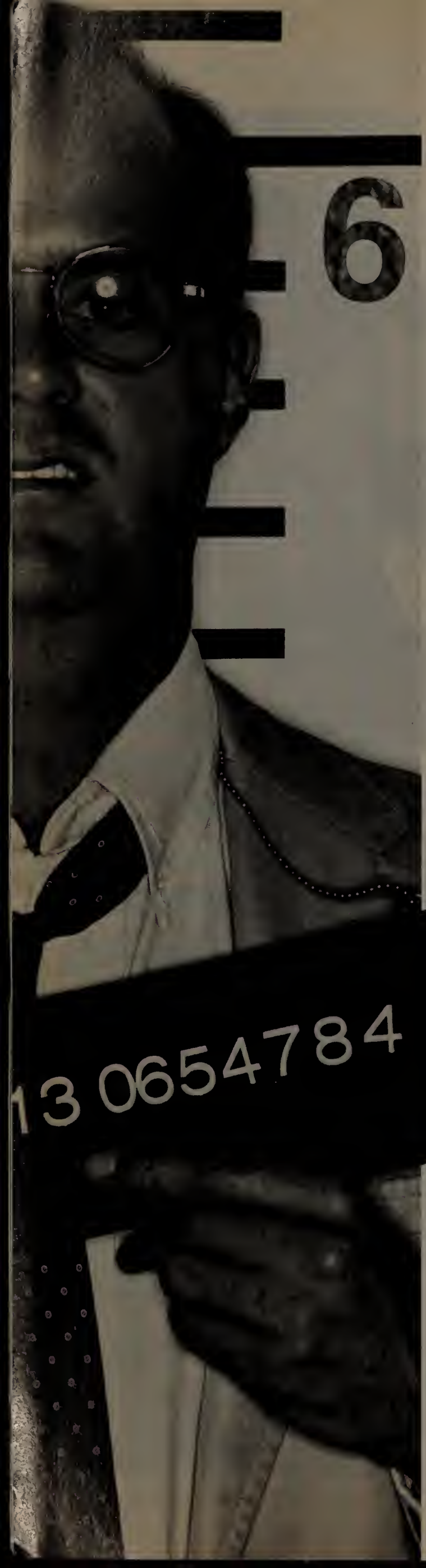
Call 1-800-538-3373, ext. 283 for your nearest dealer. Or for information via fax, call 1-800-525-3019, ext. 9792.

Then take home a SatisFAXtion Modem. And all the honors will go to you.

intel®

©1993 Intel Corporation. *All products are trademarks of their respective companies.

Circle 115 on reader service card



Anybody can protect your network from the viruses he wrote before he went in.

Untouchable protects it from the ones he'll write when he gets out.

If this guy doesn't strike you as sinister, just wait until one of his creations strikes you in the server.

When it does, you'll wish you had installed Untouchable® Network.

It's the only software that protects your network completely—from known viruses, unknown ones, even ones that haven't been invented yet.

It's designed to detect viruses anywhere they lurk—even in compressed and archived files.

And anywhere they strike—like your nodes, for example. Even when they're not logged on.

Like other anti-virus software, Untouchable is equipped with a TSR monitor and a scanner/remover.

But since scanners can be eluded by unknown viruses and TSRs are vulnerable to targeted ones, Untouchable is equipped with a unique *third* line of defense.

The Advanced Integrity Checker™ doesn't even look for viruses. It looks for *changes in your system environment* that betray any virus activity.

If the change is but a single byte, Untouchable will spot it and, using our patent-pending recovery method, safely reconstruct the infected file.

Other programs also claim to be able to do this.

But Untouchable calculates file signatures using proprietary algorithms that can't be reverse engineered. And stores an encrypted copy of these signatures on a separate Safe Disk that no virus can reach.

Since no NetWare® administrator can reach each far-off workstation, our Central Site Administration lets you install, configure, manage and monitor unlimited nodes and servers.

Without leaving your seat.

If you don't happen to be in your seat when a virus is exposed, Untouchable automatically alerts the nodes you choose, according to a nine-level priority system.

Your top priority should be to dial 800-388-0362 and learn about our one-year, money-back guarantee.

If you're a qualified NetWare Administrator, call us now. A free evaluation copy of Version 2.0 is yours for 60 days.

Which says, if you're not satisfied, we don't press charges.

FIFTH GENERATION SYSTEMS, INC

Outside U.S. & Canada call: (44) 494-442223

Circle 235 on reader service card

Ripening–and Mature–Technologies

All things come to those who wait—if they're part of an installed base of 30 million or more. Things don't always come to the PC as fast as we'd like, but they do come. This month we look at three technologies that are beginning to deliver on the PC platform: the electronic office, optical disk drives, and desktop publishing programs for Windows. We also look at enhancements to a proven product with a huge installed base: 1-2-3.

First, the new. PCs will deliver their biggest productivity gains when software lets them manage all basic office tasks in an integrated way. Microsoft At Work Architecture is a new operating system for common office equipment—fax machines, printers, copiers, answering machines, telephones—that will make integration of office tasks far better than ever before. Microsoft At Work, new telephony standards for Windows, and extensions to common fax standards will soon enable E-mail software to place faxes and voice messages in your in-box along with the rest of your electronic messages. The advantage? Instant retrieval based on subject searches. Business machines exploiting Microsoft At Work will arrive before the end of the year.

Equipping the Integrated Office

How far can today's PCs take you toward the integrated office? To find out, we invited PC vendors to send their best offerings with voice-ready fax-modems, sound cards, speakers or headphones, microphones, CD ROM drives, and software. We asked each vendor to pack as much value as possible into an office-in-a-box costing $4000 or less. Ulrike Diehlmann and Susan Silvius tested the machines and Bryan Hastings and Dan Miller did the writing in "486 PCs With the Works."

The budding electronic office requires quick, unlimited, and durable storage for the variety of disk-gobbling data needed to encode images, sounds, and text. Optical storage seems made for the electronic office. Until recently, magnetic hard drives offered more storage per dollar and faster access times. But optical drives now provide the right combination of removability, high capacity, durability of media, and fast performance. Of the dozen optical drives Scott Spanbauer reviewed for this issue, 11 store 128MB per disk and the 12th stores a whopping 256MB. This gives optical media the lead over magnetic in fast-access removable storage, since SyQuest drives top out at 88MB and Bernoulli at 150MB. Magnetic tape drives offer greater capacity but are too slow for any purpose other than archiving. Magnetic hard drives that top optical in capacity and speed are fixed rather than removable. Spanbauer concludes that improved capabilities and plunging prices have finally readied optical storage for the masses.

MICHELE CLEMENT

Of all applications, desktop publishing has the most insatiable appetite for disk space and the greatest need for removable drives. Removable drives often carry desktop publishing files to service bureaus for high-quality output, but most of those files have come from Macintoshes rather than PCs. The explanation for this is simple: The Mac has provided a better desktop publishing environment than the PC. But now Windows is beginning to rival the Macintosh. The vast Windows market offers more cost-effective computing power, a wide range of system vendors, and, finally, robust versions of the key desktop publishing packages. William Harrel, author of four books on desktop publishing, reviews four packages for Windows—QuarkXPress, PageMaker, Ventura, and FrameMaker—in "Windows DTP Comes of Age."

PC World
Editor in Chief
Phil Lemmons

Better With Age

Increased productivity can also come from improvements to existing technologies. Add-on programs, for example, can transform a mature, mainstream business application like 1-2-3 into an easy solution to your key business problems. This month, the editors of the *Lotus Edition* picked the best of the many add-on programs for Lotus's flagship application. Whether you need an extra @function, a more convincing graph, pro forma financial statements with pizzazz, or financial forecasts without tears, you'll find it in "Editors Choice: Top Add-Ons for 1-2-3."

Phil Lemmons

Phil Lemmons, Editor in Chief

You're up against 3 companies with a total of 87 employees and 13 sales reps. Time to bring in the world's most powerful partner.

The numbers are in their favor. But numbers alone aren't what this client's looking for. And CompuServe has the power to prove it.

CompuServe gives you an edge by gathering information and resources typically available only to big companies, and delivering them all to your personal computer.

Take part in dozens of professional forums and gain insights from industry experts. Get connected around town—and around the world—with E-mail and fax capabilities, plus international telecommunications (for the price of a local phone call). Collect data on markets, prospects, and competitors through reference libraries containing archived information from thousands of magazines, newspapers, newsletters, and other sources. Book your own travel, and access news off the wire as it happens. You can even keep your hardware and software up to date, and up and running, with CompuServe's hardware and software support.

Use our basic services as often as you like. All it takes is a one-time membership fee and $8.95 a month. The first month is free. Then explore our hundreds of other services available at nominal additional charges. For more information or to order, see your computer dealer or call 1 800 848-8199. Outside the U.S. and Canada, call 1 614 457-0802.

The information service you won't outgrow.™

Circle 33 on reader service card

LET'S ALL GIVE EXCEL A BIG HAND.

NOW, INTRODU
YOU'VE BEEN

LOTUS INTRODUCES 1-2-3 RELEASE 4 FOR WINDOWS.

THIS IS CLEARLY A TIME OF CHANGE FOR AMERICAN BUSINESSES.

To keep up with these changes, business people need new and better-suited tools. Lotus® has responded by rethinking and re-creating the spreadsheet as a tool for individuals and for workgroups. 1-2-3 Release 4 incorporates over 4,000 spreadsheet user suggestions. It's dramatically easier to learn and use than any spreadsheet in history. And it's the first spreadsheet that's actually designed to help people work together in impressive new ways.

> *1-2-3 leapfrogs Excel and Quattro...*
> *–PC World 6/93*

IT'S MORE POWERFUL BUT VERY SIMPLE.

While adding dozens of major new features, hundreds of macros and hundreds of tools and @ functions, Lotus has actually simplified the way you work in a spreadsheet.

For example, Release 4 features an @ function pull-down menu to help you build spreadsheets faster. Cell copying is now a simple drag-and-drop operation, with meaningful visual feedback. And changing text and font attributes is done in one dialog box. (Excel often requires three.)

So 1-2-3® is not only a lot friendlier and easier to use than any other spreadsheet, it's a significant advance over Microsoft® Excel in usability.

THE FIRST CONTEXT-SENSITIVE USER INTERFACE.

> *The SmartIcons in 1-2-3 for Windows are smarter, and Lotus' approach to swapping different tool-bars in and out beats Excel's and Quattro Pro's.*
> *–PC Computing 6/93*

Release 4 actually anticipates what tools and functions you'll need. Depending on what you're doing, 1-2-3 presents only the menu choices and **SmartIcon**™ palettes appropriate to the operation at hand.

This means you won't spend time clicking through menus looking for the features.

IMMEDIATE ON-SCREEN MANIPULATION.

A **Live Status Bar** on screen

shows the attributes of any highlighted element.

To make a change (like font, size or decimal points) you just click on the appropriate section of the status bar. Then scroll up to your chosen attribute and click again.

And unlike Excel, 1-2-3 R 4 includes **In-Cell**™ **Editing**, so you can enter and edit any information right in the cell.

*In Canada call **1-800-GO-LOTUS** Please have your credit card and product package ready when you call. © 1993 Lotus Development Corporation. All rights reserved. 55 Cambridge Parkway, Cambridge, MA 0214

CING THE ACT WAITING FOR.

ONE-STEP CHARTING.

With **One-Step Charting,** you can pick up all titles, data, legends and axis labels right from the worksheet to create a great looking chart the first time, automatically. And you can edit the chart right in your worksheet.

NAVIGATE THROUGH 3 DIMENSIONS.

Anyone who works on multiple worksheets will appreciate the new 1-2-3 **Worksheet Tabs** which can be labeled with real words. So you can go directly to any sheet simply by clicking on the appropriate tab.

And Worksheet Tab names are then incorporated into formulas. All of which helps to keep 1-2-3's unique 3D technology simple and easy to use.

12 | Height 14 Width 9

DATABASE FUNCTIONS MADE EASY.

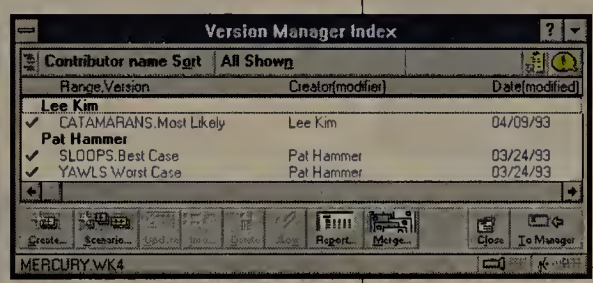
> *1-2-3 for Windows has always had more powerful database features than Excel or Quattro Pro, and now these features are also easier to use.*
> *–BYTE 6/93*

The 1-2-3 database now has a new, completely graphical interface that makes using it easier than ever. Plus 1-2-3 provides a range of built-in tools that are powerful without being perplexing.

For example, to modify or create a query, you don't generate criteria and output ranges with cryptic commands. Just bring up the Query Dialog Box and select the fields and records by name. Changing your query is as simple as drag-and-drop.

THE FIRST SPREADSHEET FOR WORKGROUPS.

Have you ever forgotten why you used a particular number? Or wanted to track more than one value in a cell or range? Suppose you've sent a spreadsheet to a co-worker who develops a whole new version and sends it back? How do you integrate it into your work?



You use the **Version Manager,** that's how. It tells you who did what when, and why they did it. It lets you save, label, track, mix, match, merge and comment on ranges, worksheets or entire files. And it does it all without overwriting existing data.

> *It (Version Manager) also makes Microsoft Corp.'s Scenario Manager in Excel 4.0 look like a toy by comparison.*
> *–PC Week 5/3*

If you have Lotus Notes,® the workgroup benefits of the new 1-2-3 take on even greater proportions. Now different users can access and work on the same spreadsheet at the same time. Notes maintains file integrity and notifies you of changes made by others. So you know you're using the right numbers.

THIS IS THE BIG ONE.

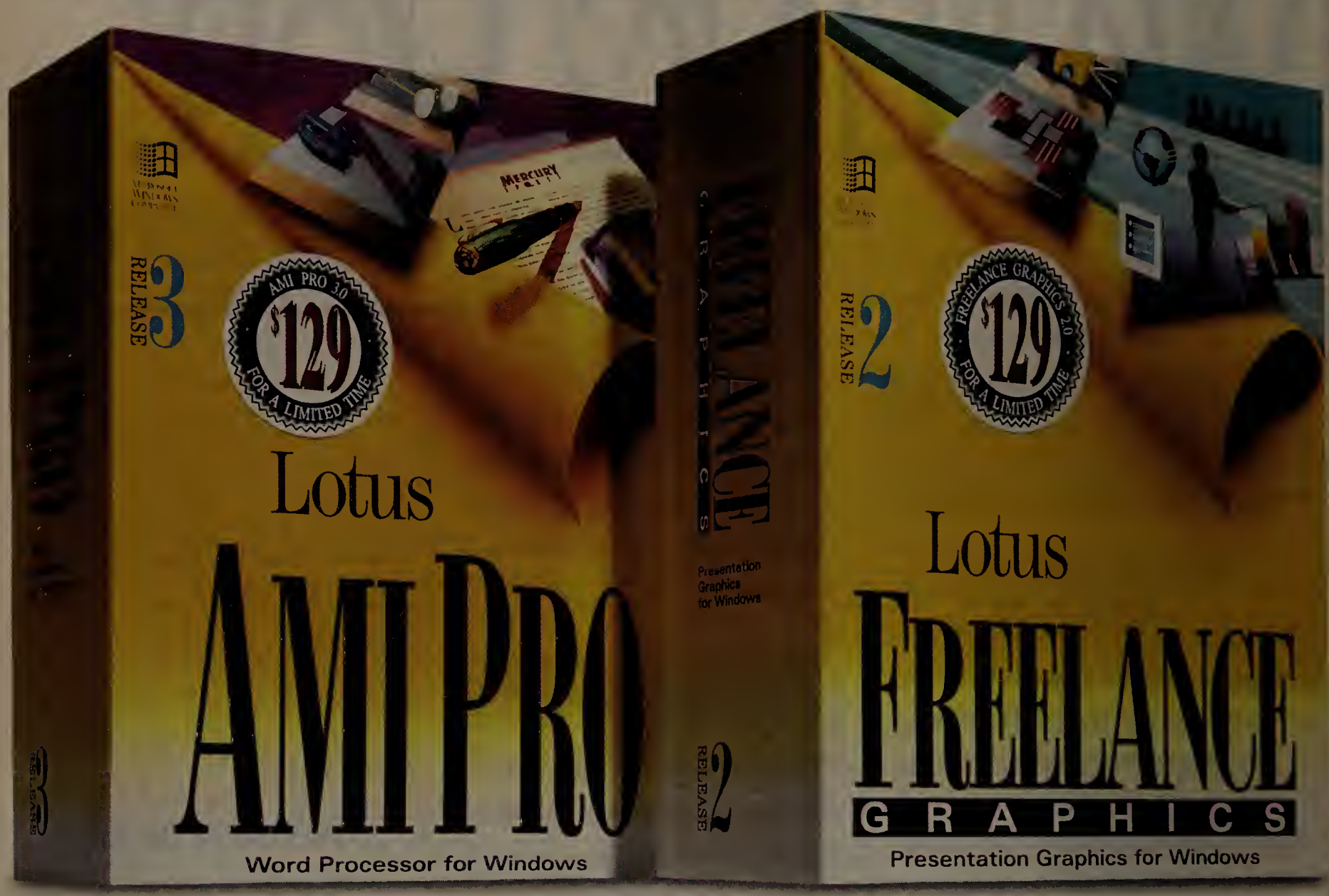
Lotus 1-2-3 Release 4 is here. And it's the smoothest path from DOS to Windows.™ Plus, it's network ready. So one box is all it takes to upgrade all your users, whether they're working off a server or their own PC.

Call 1-800-TRADE UP, ext. 9005,* for a free demo disk or to order your upgrade for just $119 direct from Lotus. Or visit your Lotus Authorized Reseller.

Lotus 1-2-3 Release 4
SPREADSHEET FOR WINDOWS

s. 1-2-3 and Lotus Notes are registered trademarks and SmartIcons and In-Cell are trademarks of Lotus Development Corporation. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation.

1-2-3 IS BACK. AND

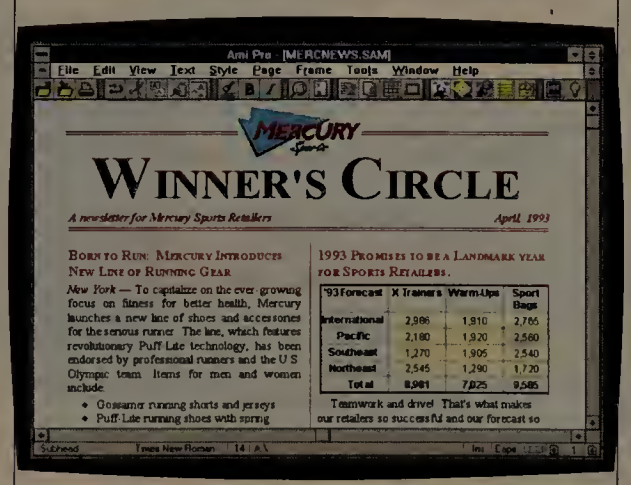


SYNERGIZE AND SAVE

For a limited time, when you get Lotus® 1-2-3® Release 4, you'll save on the industry's top-rated desktop applications. Applications designed to work with and optimize the power of 1-2-3.

In other words, you'll save money, time and work. And if you're just climbing into Windows, Lotus makes the whole transition a lot easier.

BUY 1-2-3 RELEASE 4 AND GET AMI PRO 3.0 FOR $129*



Ami Pro is rated best word processor. Its tight integration with 1-2-3 Release 4 makes it even better.

Ami Pro® 3.0 has been rated the number one word processor by virtually every critic and reviewer. Eclipsing both Microsoft® Word and WordPerfect® If you're wondering why, there's no time like the present to find out.

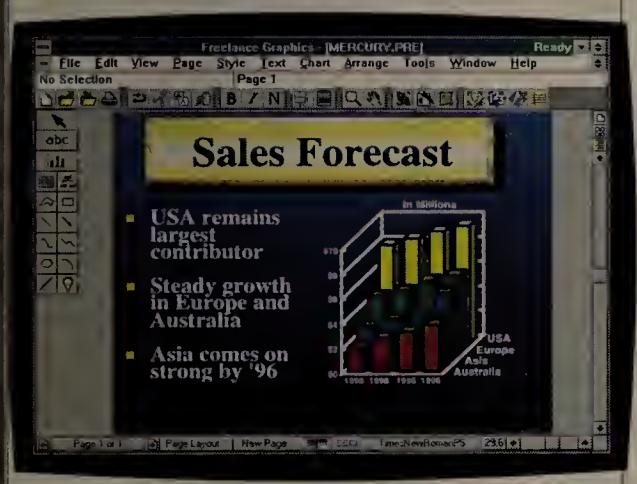
Simply put, Ami Pro is a faster, easier, friendlier word processor to use. It produces such great-looking documents with so little effort, most people never even bother to open the manual.

*$129 direct from Lotus. In Canada direct price is $159. Offer good until 8/31/93 or while supplies last. †In Canada call **1-800-GO LOTUS.** And please have your credit card and product package ready when you call. ††Demo disk only are registered trademarks and SmartMasters, Lotus Organizer and SmartSuite are trademarks of Lotus Development Corporation. ccMail is a trademark of ccMail Inc., a wholly owned subsidiary of Lotus Development Corporation. are registered trademarks of

IT'S NOT ALONE.

Plus Ami Pro has the tightest integration with 1-2-3 Release 4. Features like shared Dictionaries, SmartIcons® and a Live Status Bar make Ami Pro the best choice in word processors for 1-2-3 users.

BUY 1-2-3 RELEASE 4 AND GET FREELANCE GRAPHICS 2.0 FOR $129*



Freelance Graphics 2.0 is the easiest presentation software. With the new 1-2-3, if you change the spreadsheet, the presentation changes itself.

According to reviews and independent testing labs, there is no faster or easier way to create professional presentations than Freelance Graphics® 2.0. Its SmartMasters™ and one-click access to galleries of chart styles and symbols make it easy for anyone to make great color or black and white presentations in any format, including handouts. In the most recent Usability Sciences Corp. study, it took 64% less time to create a presentation with Freelance Graphics than with Microsoft Powerpoint.®

Like Ami Pro, Freelance offers Working Together® capabilities with 1-2-3 and other Lotus applications that open up a whole new world of ease and usability. You can simply import a graph from 1-2-3 and it will arrive in your Freelance presentation, fully editable.

GET THE BEST OF ALL WORLDS WITH SMARTSUITE 2.0

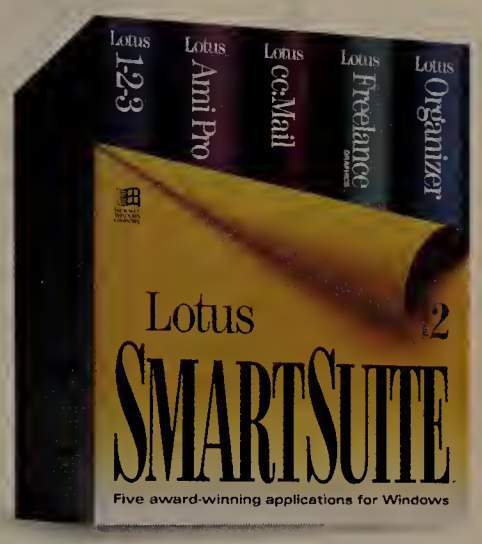
As 1-2-3 has done for spreadsheets, the new Lotus SmartSuite™ has dramatically redefined the idea of applications working together.

Taken one at a time, the five applications in Lotus SmartSuite are a Windows™ desktop All-Star team. The new 1-2-3 Release 4 spreadsheet. Ami Pro 3.0 word processor. Freelance Graphics 2.0 presentation graphics software. cc:Mail,™ far and away the industry's top e-mail system. And Lotus Organizer,™ the multi-award-winning desktop personal information manager.

Others talk about application integration, but compared to SmartSuite, it's all token.

Together, on one desktop, Lotus SmartSuite is unarguably the most powerful, most integrated suite in the industry. Once you're comfortable with one application, like 1-2-3, you're instantly at home in all five. More impressive, SmartSuite now ships with the Working Together Bonus Pack, a unique set of features designed to dramatically enhance the integration between Lotus Windows applications. This makes moving from application to application so quick and easy, and using functions from one application while working in another so natural, it feels like the entire suite is one piece of software. And there's absolutely no reason to settle for anything less.

So visit your Lotus Authorized



Once you're comfortable with one application, like 1-2-3, the common look and feel makes you right at home with all five.

Reseller. Or call **1-800-TRADEUP, ext. 9010** to order† or to get your free full-featured working models.††

Lotus.

available for SmartSuite and 1-2-3. *1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus, 1-2-3, Ami Pro, Freelance Graphics, SmartIcons and Working Together Microsoft and PowerPoint are registered trademarks and Windows is a trademark of Microsoft Corporation. WordPerfect is a registered trademark of WordPerfect Corporation. Adobe Type Manager and the ATM logo Adobe Systems Inc.

Now You Can Count On Us For A Lot Less.

~~Reg. $595.~~ Now Only

$229.*

*For a limited time only.

About $400 less.

But what counts the most isn't the savings, but the fact that CA-BPI® Accounting II is one of the all-time, best-selling accounting software programs in the world. Literally millions of small to medium businesses count on CA-BPI Accounting II.

Now you can too. For a fraction of what it usually costs you can get it all. All the functionality you'll ever need. Totally integrated and with automatic double-entry. Network capabilities for up to 40 users. Special intuitive pull-down menus and a "selector" that makes look-up a snap. With customizeable financial statements, reports, invoices and purchase orders that can help your company look like a million bucks.

- *General Ledger*
- *Accounts Receivable*
- *Accounts Payable*
- *Order Entry*
- *Inventory Control*
- *Payroll US And Canadian*
- *LanPak™*
- *Data Security And Integrity*
- *Technical Support*

See Your Local Dealer Or Call 1-800-225-5224, Dept. 32108.

This offer is for a limited time so pick up your copy of CA-BPI Accounting II today. Then use it to count all the money you saved.

COMPUTER ASSOCIATES®
Software superior by design.

New CA-BPI® Accounting II

* Based upon suggested promotional retail pricing. Actual dealer pricing may vary. © Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies.

Circle 39 on reader service card

Deceptive Tactics, DOS 6.0 Caveat, Expanding Consumer Protection

Bitter Bile

Your June cover line "486 PCs for $1000" caught my eye, and I was delighted since I'm shopping for a 486 on a tight budget. But when I sat down to read the article, I was taken aback. Right in the table of contents, it said "486s for $1250." Immediately I felt ripped off. Sure enough, the article includes one computer for $1025, one for $1099, and the rest for $1150 to $1495.

Although it was an excellent article, the deception left a bitter taste in my mouth about your publication. If I ran my advertising that way, they'd call it bait and switch.

James P. Balis, Brooklyn

Editor's response: We apologize for the error, which occurred because of late changes to the cover. At the time, we expected many of the 486 system prices, which have been falling continuously, to drop to $1000. Few prices fell to that level by press time, however, leading to the discrepancy you point out. System prices may have fallen still more by the time the June issue reached your newsstand.

Consumer Bulldog

Thank you for your excellent *Consumer Watch* column. Our business has had problems with both Business Computer Systems and Bulldog Computer Products, both of which were mentioned in *Consumer Watch* in June. It's nice to see a magazine willing to print a column that its advertisers might not like.

Consumer Watch alone makes your magazine worth subscribing to.

Kevin Krueger, Egeland, North Dakota

Editor's response: Because of the popularity of our consumer coverage, we've created a new User Issues Department that will include not only this column but also special reports and feature articles. Much of our consumer coverage is a result of reader letters to *Consumer Watch*, so drop us a note if there's an issue you think we should address.

What About WordStar?

In "Word Processor or Desktop Publisher?" in June, William Harrel claims that all the word processors mentioned lack one essential feature for creating newsletters: frame linking.

Harrel didn't look at WordStar for Windows. WordStar for Windows can link frames so that the information in one frame flows into another frame on another page. You can even link multiple frames.

Stephen C. Payer, WordStar Product Manager, Novato, California

A Tough One to Lose

May's "DOS 6: Do You Need It?" was right on. I find DOS 6.0 a big step ahead, although not the quantum leap that 5.0 was over previous versions.

I think you ought to issue a strong caveat, though: Once DoubleSpace is installed, it can't be uninstalled except after a complete backup. You have to delete everything and restore it all, which could become an all-day job. This vital information is not prominently placed at the beginning of the section on DoubleSpace, but buried deep in the back of the text.

I fear that many people will blithely use DoubleSpace and then be chagrined if they can't get rid of it.

Geoffrey Orton, Altamont, New York

A Macro With Strange Results

Readers who try to use the font-switching macros described in the *Word Processing* column in June may get strange results.

WordPerfect 5.1 macros don't recognize font names. They know only how many times you've given the {Up} command. If you start from the original base font each time you call one of these macros, you'll be fine. But if you call two macros back-to-back, you'll be somewhere out in never-never land.

One solution might be to create a companion macro for each font change that reverses the operation. A more reasonable solution would be to create a style for each font change and write a macro to call up that style.

Bob Hollis, Scottsburg, Indiana

Author's response: The answer I gave is correct for the situation posed by the questioner, who wanted to switch to different fonts at the *beginning* of documents. For font switching in the middle of a document, it is better, as Hollis points out, to create a style and use a macro to switch to it. —*George Campbell*

ROBERT NEUBECKER

The Moral of the Story

I read your article on repetitive strain injury (RSI) in the May issue ["Danger at Your Fingertips"] with great interest. I put up with a lot of pain for three years before finally consenting to surgery. Six months after surgery, I have a 7-inch scar that even the doctors admit is unsightly. I have been told that I should probably never type for more than 2 hours a day.

My employer was unable to find a job for me that required less typing, so now I find myself dealing with a workers' compensation system that hasn't a clue about how to place injured computer workers. I worked hard to acquire my computer skills, considering them my

passport to a good job in a largely rural state with a tight economy. Now I'm being told to consider a job as, say, a sales clerk. If I can't earn enough to keep my house, well, that's too bad.

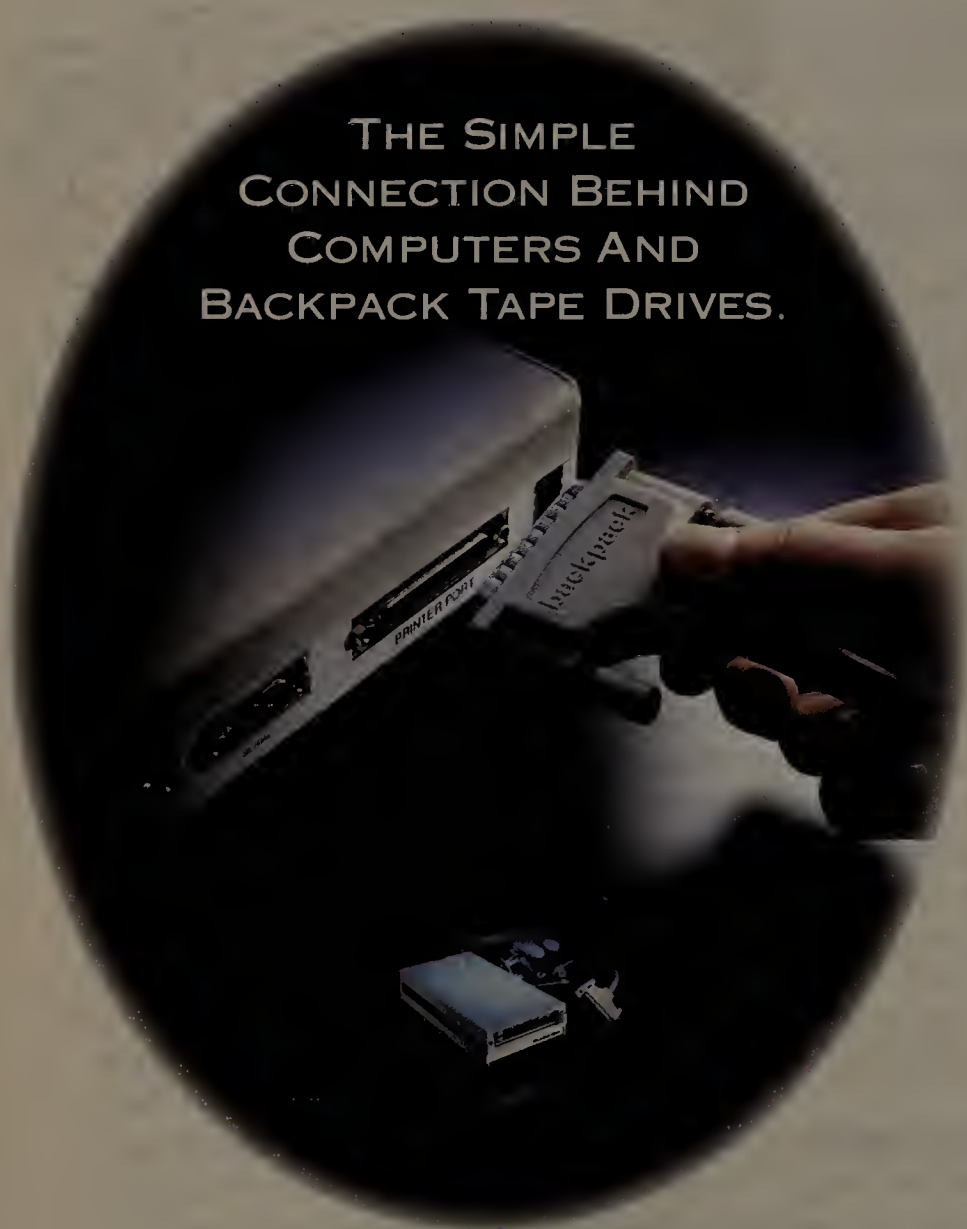
If there is a moral to the RSI story, it's this: Don't get injured. If your employer refuses to make your workstation and environment safe, refuse to work. Jobs may come and jobs may go, but RSI is forever.
Name withheld by request

The Asinine QWERTY

May's "Danger at Your Fingertips" is a fine explanation of the causes and terrible effects of all-too-common repetitive strain injuries.

I would like to point out that the QWERTY keyboard is virtually unchanged since Christopher Sholes patented it in 1878. It was designed to make typing more difficult: Sholes experimented with a purely alphabetic keyboard layout, but the keyboard jammed if certain key combinations were typed too rapidly. So he took combinations of letters that are usually adjacent in the English language and arranged them so you have to use the same finger in different positions to type them, thereby slowing the typist and preventing jamming.

Other layouts have been suggested, the best of which was designed in the 1930s by August Dvorak. He used time-and-motion studies and took into account the frequency of letters. The reason this vastly superior keyboard design hasn't replaced the asinine QWERTY keyboard layout is that humans are resistant to change. Clearly, it's an idea whose time has come.
Mark Gardner, Lincoln, Nebraska



It's fast. It's small. It's reliable. It's incredibly compatible.

Backpack is the best selling parallel port tape drive on the market. We'd like to tell you why.

With Backpack, tape backup is quick and simple. Just plug it into your printer port and it's ready to use. No hardware conflicts, no slots required. One model fits all IBM PCs, compatibles and portables, regardless of CPU speed.

Backpack can store up to 250MB on a tape using data compression, is completely QIC80 compatible, and reads QIC40 tapes.

With its compact size and 1Mbps transfer rate, Backpack is the smallest and fastest parallel port tape drive you can buy.

Micro Solutions is dedicated to the perfection of backup technology.

CD-ROM, hard drive, and diskette Backpack drives are also available. Call today for ordering information and a dealer nearest you.

Telephone 815.756.3411 FAX 815.756.2928

MicroSolutions
132 West Lincoln Highway DeKalb, IL 60115

Call Toll Free 800.294.1214

Circle 200 on reader service card

My Friends Believe Me Now

I read Steve Bass's *Home Office* column in the May issue and immediately decided to subscribe. I've been raving about the virtues of QEdit for years, but most of my friends believe that the only software worth considering is that which comes from giants like Microsoft. Now, thanks to Steve Bass, I can substantiate my enthusiasm.
Charles Obler, Farmville, Virginia

Missed Communication

The *Communications* column in June discussed services that offer access to Internet but completely ignored the biggest and best: Delphi. Delphi offers all Internet services, including FTP, Telnet, E-mail, Archie, Gopher, WAIS, Veronica, and more.
Ray Jones, New Orleans

Author's response: Much of Delphi's access to Internet is fairly new. The features you mention weren't on the service when we went to press. But the low-cost, easy-to-use access that Delphi is now providing is exciting and something readers should know about. Thanks for mentioning it.

Delphi is offering a free, 5-hour, no-obligation trial membership to new users. Access to Internet costs either $4.80 an hour or $7 an hour in the evening, depending on whether you sign up for a $20-per-month or $10-per-month subscription. For details, call Delphi at 800/695-4005. —*Judy Heim*

Save It for Key West

Referring to your headline "Weird Keyboards: Rx for Hands?" in the May *Top of the News* section, I believe that "Ergo-

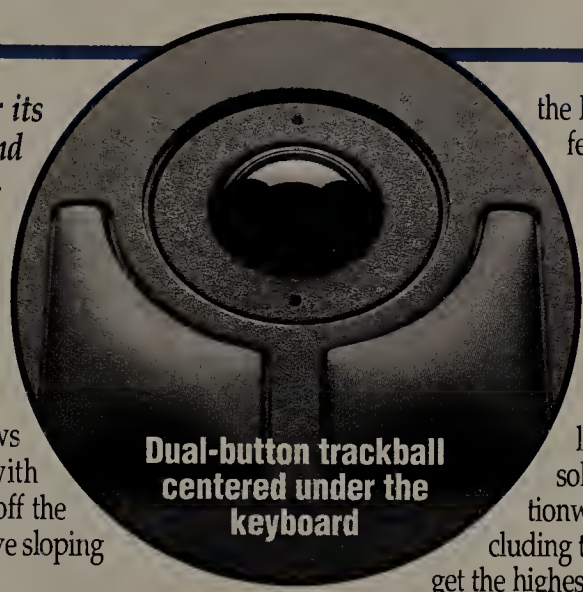
Windows at Your Fingertips

PC Magazine recommends the WinBook "...for its comfortable and efficient keyboard, trackball, and wrist rest; good battery life; and full complement of equipment at a good price."

PC MAGAZINE, June 29, 1993, First Looks

The WinBook by Micro Electronics™ gives you all the power to run Windows, and a unique, ergonomic design to make it easier to use.

It features a built-in, centered trackball which allows you to control cursor movements effortlessly with either thumb without having to lift a single finger off the keyboard. Full-size keys and the WinBook's exclusive sloping hand rest let you work in total comfort.



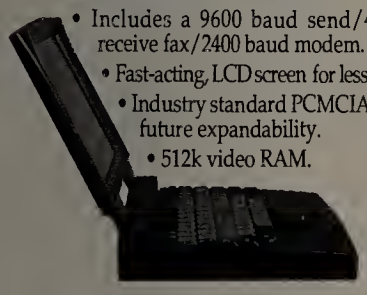
The WinBook comes with the power and speed needed to run Windows effectively. You get 4MB memory, the new ultrafast 486 SLC/E processor and the Motorola chipset which provides eight power-saving features, even while running Windows. Plus, we have fine-tuned the WinBook's screen. In monochrome and now in dual-scan STN color—you get sharper and clearer images with less cursor loss.

The WinBook was engineered for Micro Electronics, a division of MEI/Micro Center, Inc. MEI is America's leading direct source for computer accessories. Micro Center has been selling PCs for more than 14 years—longer than IBM or Compaq—with over 736,000 units sold. And with over 2.2 million satisfied customers nationwide, we have developed a superior support staff, including top engineers and technical specialists. So you always get the highest quality product at the lowest possible price.

Before you choose a notebook computer, look at the WinBook—the first notebook computer designed specifically for Windows.

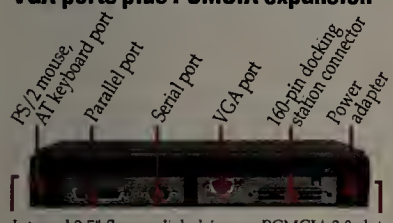
WinBook™

The 5.4 lb. WinBook, designed by award-winning Palo Alto Design



- Includes a 9600 baud send/4800 baud receive fax/2400 baud modem.
- Fast-acting, LCD screen for less cursor loss.
- Industry standard PCMCIA 2.0 slot for future expandability.
- 512k video RAM.

Mouse/keyboard, parallel, serial and VGA ports plus PCMCIA expansion



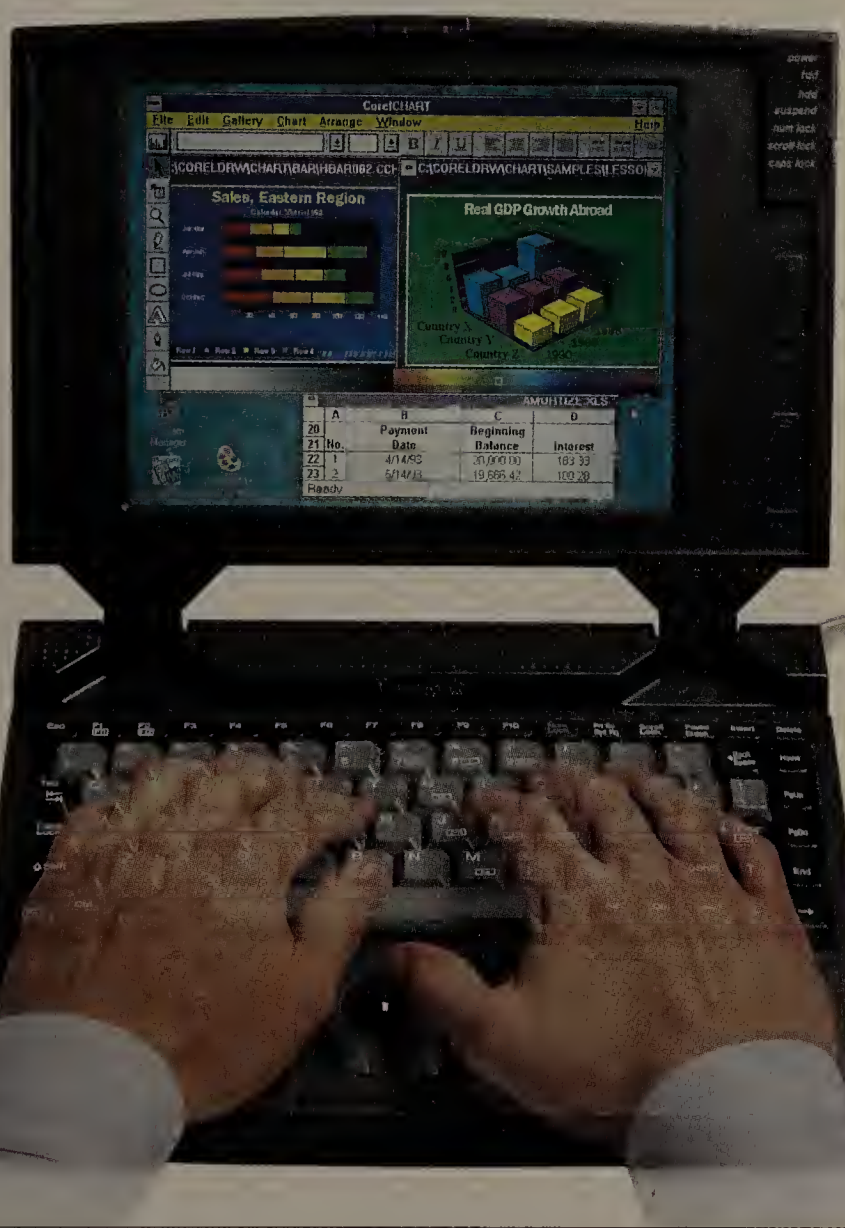
Internal 3.5" floppy disk drive PCMCIA 2.0 slot

Clean, sharp color display

The superior quality of the WinBook's new dual-scan STN color display gives you near active matrix quality at a passive matrix price.

Longer battery life

The WinBook features NiMH 2200 MA batteries with gold-plated contacts. This allows it to run much longer than units with traditional NiCAD batteries—and there's no memory effect.



Docking station gives you desktop power

With the available docking station, your WinBook instantly becomes a full-function desktop computer. The two expansion slots and drive bays allow you to add peripherals such as monitors, hard drives, CD ROMs, I/O cards or an extended keyboard. It also includes parallel, serial, PS/2 mouse, external keyboard and VGA ports.

And it's just $399!

Monochrome	Dual-Scan Color
$1599	$2299

- 486 SLC/E 25MHz
- 4MB RAM
- DOS & Windows
- 120MB (15ms) HDD
- Fax modem included

Service, warranty and support

- 72-hour service turnaround guarantee.
- 30-day unconditional money-back warranty.
- 24-hour burn-in protection.
- One-year limited warranty on parts and labor.
- Toll-free technical support for the life of the computer.

Your satisfaction is unconditionally guaranteed for 30 days from date of purchase. If for any reason whatsoever you are not satisfied with your purchase from us, we want you to return it. We will be glad to repair the product or give you your money back.

No-risk, 30-day unconditional money-back guarantee

Specifications

Size/Weight
- 11" X 8 3/4" X 1 3/4"
- 5.4 lbs. with battery (monochrome)
- 5.9 lbs. with battery (dual-scan color)

Pointing Device
- 16mm Alps dual-action, Microsoft-compatible trackball

Battery
- Up to 3 hours with power management (less 30 minutes for color)
- NiMH (no memory effect)
- 2200 MA with gold-plated contacts
- Worldwide auto-sensing AC adapter
- Quick 2-hour recharge

Power Management
- Eight power-saving features

Processor and Memory
- 486 SLC/E-25MHz CPU
- 4M8 RAM
- 1MB ROM for AMI BIOS
- Motorola chipset
- 1k internal cache

Drives
- One built-in 1.44M8 3.5" floppy drive
- Internal 120MB (15ms) hard drive
- 250MB (12ms) hard drive optional

Software
- Comes loaded with MS-DOS 6.0 and Microsoft Windows 3.1

Display
- Super-twisted 64 grayscale, 10" LCD and 1024 x 768 for external monitor with 512k
- Optional dual-scan STN color display
- Adjustable contrast and brightness
- Visible LED indicator on cover-down

Keyboard
- Full-function keyboard with 85 keys and 4 inverted-T cursor control keys, 3.0mm keyboard spacing

Modem
- Fax-9600 baud send/4800 baud receive/2400 baud modem

I/O Ports
- PS/2 mouse interface/AT keyboard interface
- PCMCIA 2.0 slot
- Serial: 9-pin connector
- Parallel port
- Video: 15-pin connector for CRT
- 160-pin docking station

Options
- 250MB (12ms) hard drive
- 8MB RAM
- Coprocessor
- Docking station

© 1993 MEI/Micro Center, Inc. All rights reserved. Micro Center is a registered trademark of Micro Electronics, Inc. MEI is a registered trademark and Micro Electronics and WinBook are trademarks of MEI/Micro Center, Inc. All other trademarks and registered trademarks are property of their respective corporations.

Convenient payment options

Use your VISA, MasterCard, Discover Card, personal check or P.O. with credit approval

Micro Electronics
a division of MEI/Micro Center, Inc.

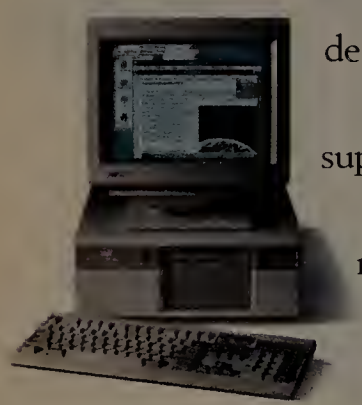
Order the WinBook today. Call 1-800-468-1037

1160 Steelwood Rd., Columbus, OH 43212 • FAX: 1-800-448-0308 • Monday through Friday, 8am-9pm EST • Saturday, 9am-4pm EST

Circle 197 on reader service card

Oblivious to the exploding SUPERNOVAS above, an AST engineer sits *Glued* to her PC.

Understand it's not that our people suffer from a lack of free time. It's just that they would rather spend their free time perfecting PCs. Obsessive? Perhaps. But it's from this commitment that our latest high-performance desktop system was born. Premmia™ systems feature AST's local bus video design, while models with Intel Pentium™ processors move data via a 64-bit superhighway. Add AST's new LocalMotion™ video drivers for full-screen, full-motion video and you've got the kind of performance that's ideal for today's — and future — Windows, graphics, and multimedia applications.

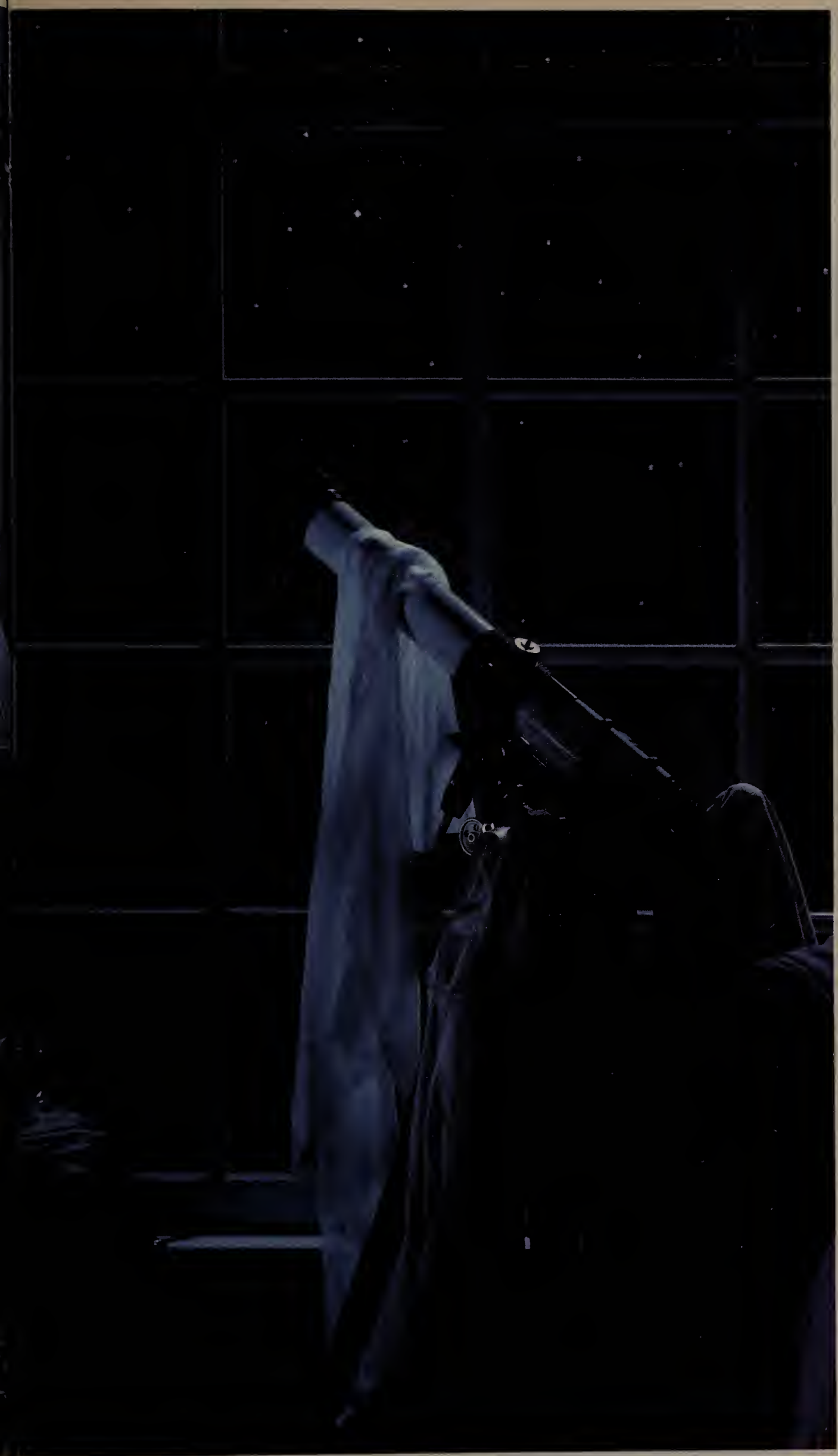


The Premmia system is just one of the reasons that businesses in over 100 countries look to us for PC-based solutions. And with results like that, we honestly don't mind missing a streaking comet or two.

AST® COMPUTER

The Product Of Our Obsession.

© 1993 AST Research, Inc. All rights reserved. AST, AST logo are registered trademarks, and Premmia and LocalMotion are trademarks of AST Research,



PREMMIA

POWER

Intel Pentium, 486DX2/66, 486DX2/50, 486DX/33, or 486SX/33 processor. Internal cache. Up to 512KB second-level cache available.

VIDEO

AST local bus video, with optional 2MB supporting 64-bit video performance. AST LocalMotion for full-screen video playback.

UPGRADABLE

Intel OverDrive™ Ready. Five EISA slots. Five drive bays. Up to 128MB memory.

SECURE

Multiple password levels, port locking, asset management, and patent-pending Walk-n-Lock — which invokes password protection after a period of inactivity.

RESPONSIVE

To learn more about our Premmia desktop, call 800-876-4AST.

VISION

Parks Astronomical Telescope with an equatorial mount and 80mm refractor. Optional, of course.

intel inside

pentium PROCESSOR

e Intel Inside logo is a registered trademark and Pentium and OverDrive are trademarks of Intel Corporation. All other trademarks are the property of their respective owners.

nomic Progress, Rx for Wrists!" might have been more appropriate.

The word *weird* should be reserved for certain residents inside the DC beltway, academia, and Key West, Florida.

Peter J. Apol, Gotha, Florida

There Is a Simpler Way

Tip 4 in June's "50 Spreadsheet Tips" states that you can ensure exact matches for a table lookup by using the formula @IF(@LOOKUP(PART,LIST,0)=PART,@VLOOKUP(PART,LIST,1),@NA).

This method seems unnecessarily complex to me. If you enter the part number as a label rather than a value, the formula @VLOOKUP(PART,LIST,1) alone will produce the desired result.

If there is a match, then the part description is generated. If there isn't a match, the formula returns 'ERR'.

Arlene Podos, New Hyde Park, New York

A Careful Reader

I discovered a number of errors in June's "50 Spreadsheet Tips." Tip 1: The first formula should be **@INT(@RAND()*(B1–A1+1))+A1**. Tip 3: There should be no space between the first **&** and **@STRING** function. Tip 6: There should be no space before any **(**, and the second **@ABS(A1)** function should be followed by a **<**, not a comma. Tip 8: **<Ctrl>-<Insert>** is used in Windows to *copy*. Tip 11: The formula is missing the minus sign before the first **@SUM(X)**. Tip 19: Both formulas should begin **@IF(Bottomline=0**. Tip 35: To match the figure, the formula should be **=SUM(IF(D6<=SHARES,1))**. Tip 40: A comma is missing between **"Audit"** and **"Showcirc"**.

Shane Devenshire, Walnut Creek, California

Corrections and Clarifications

The list prices in May's "CD ROM Drives: The Time Is Right" for the Relax Technology Vista I Texel DM 3024 external and parallel-connected models should both be $599. The list prices for the Vista II Toshiba XM3401 external and parallel-connected models should be $649. The Trantor T130 adapter card for external drives costs extra.

Bug Watch in May's *Consumer Watch* should have listed the correct version of PKZip's maintenance release as 2.04g.

In June's *Home Office*, we omitted the phone numbers for It's Your Money, maker of Uninstall for Windows. The numbers are 201/663-4577 and 201/663-2110 (fax).

June's evaluation of disk caching hardware and software, "Caches Pay Off," should not have warned against using Aldridge's Cache86 with AddStor's SuperStor. Cache86 is compatible with SuperStor.

The correct name, price, and CPU type of the Compudyne system in "Mobile Tips" at the bottom of page 232 in July's special report on mobile computing are Compudyne 486SL/25 Notebook, $1999, and 486SL-25 Intel processor, respectively.

The DEBUG script in July's *Help Line* ("Num Lock On") should be stored in a file named NLOCKON.SCR; the 'B' following the script's 'RCX' should be on its own line.

The correct version number for ImagePals from U-Lead Systems, mentioned in July's *Windows* column, is 1.2.

PC World regrets the errors.

PC World *welcomes your reactions and ideas. See page 12 for contact information.*

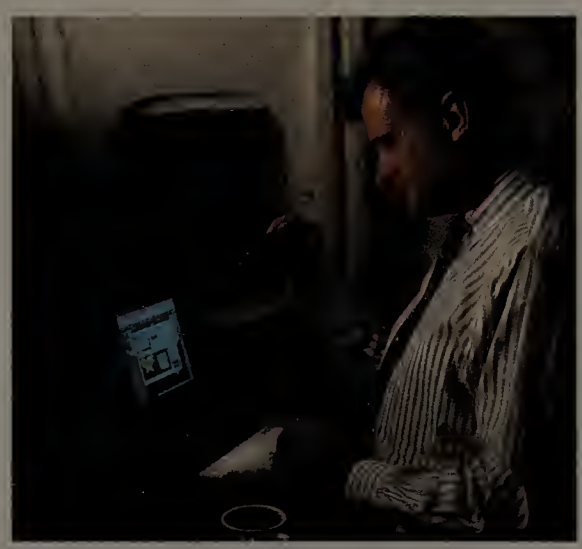
STAND UP WITH THE INDUSTRY LEADER BEHIND YOU

Business has changed. Computers are everywhere. If you want to have impact, your ideas have to be big. Slides and overhead film just won't do. Large images, brilliant color, crisp data, beautiful video. Move your audience. Display your presentation—directly from nearly any computer or video source—with the *n*VIEW projection product that is right for you. Award-winning presentation solutions which are easy to use and completely portable. *n*VIEW. The leader in high-performance projection displays. For more information on *n*VIEW products call 1-800-736-8439 or 804-873-1354.

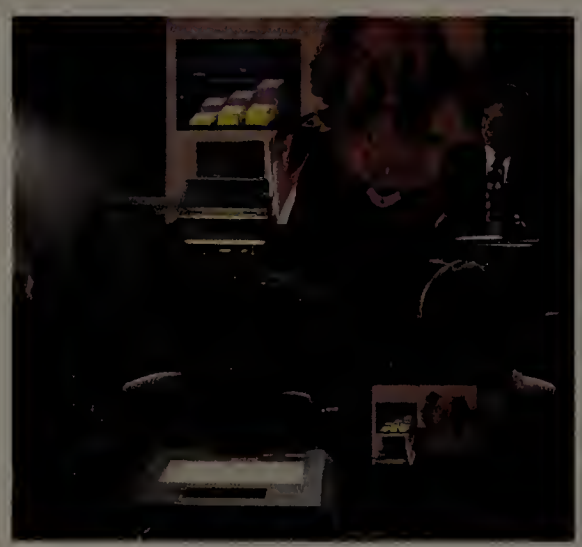
FREE SOFTWARE!
Lotus® Freelance Graphics® is now included with every ViewFrame® Spectra C panel.

*n*VIEW
VISIONARY DISPLAY TECHNOLOGIES

ANY COMPUTER, ANY SOFTWARE.



ANY CHANGES, ANY TIME.



ANY AUDIENCE, ANYWHERE—LIVE DISPLAY OF COMPUTER & VIDEO IMAGES.

Circle 176 on reader service card

Getting the Lowdown on Hardware-Software Bundles

I don't know about you, but I'm a sucker for one-stop shopping. I'd rather pick up the phone and order everything from a catalog—even stand in one of those interminable lines at Price Club—than spend a Saturday driving all over town with two kids fighting in the backseat of the car. That's the notion behind the trend to bundle software applications with PCs. In one purchase you get all the hardware and software you need to get up and running.

It's a pretty enticing deal, and a trend that has attracted the attention of both first-time PC buyers and experienced users looking to upgrade to a higher-class system. Browsing through the most recent issue of *PC World*, I found ads for a dozen companies selling a range of software applications with their systems. Zeos offers just about every package in Lotus's software suite, Compaq has different bundles for various ProLinea systems, Gateway throws in one Microsoft or Borland package with every system sold...the list goes on. Everyone from IBM to Packard Bell is sweetening the hardware deal with an application or two.

"I wouldn't base my buying decision on whether or not I got software bundled with the computer, but it is a nice feature as long as you're getting something you really need," says Kevin Pyle, a deputy auditor in the Hamilton County, Ohio, auditor's office. Pyle got Borland's Paradox for DOS database, the C++ programming language, DOS, and Windows with his Gateway system and says the added software "did tip the scales" in Gateway's favor.

But Pyle, like many PC buyers, discovered a few kinks that have yet to be worked out of the PC-software bundling arrangement. The thorniest issue is product support, but readers have sent letters on a host of other software bundling questions—from missing floppy disks and manuals to concerns about whether they are getting the "real" application or a trimmed-down version.

ROBERT HOLMGREN

Take Pyle's case, for example. Though his system came with Paradox and C++ installed on the hard disk, the original floppy disks and documentation were missing for both packages. "I could live without the manuals, since both programs have extensive README files," says Pyle, "but what worried me was the fact that if Windows crashed I wouldn't have the original disks to reconfigure the system."

Get Those Disks

As it turns out, Gateway's policy is to include both documentation and disks with each package. In this case, floppies and manuals were on back order, and Gateway told Pyle it would send the completed package as soon as the new shipment arrived. Pyle ultimately got everything he'd ordered (plus a copy of Quattro Pro for Windows for his trouble), but he offers this bit of advice to fellow buyers: "Find out if you'll get the original disks and documentation. A lot of new buyers don't realize that if the software is loaded only on the hard disk, you need to back up that puppy as soon as you get it home."

Another recent PC buyer was a little more annoyed. "After spending $2500 for a new 486DX2 without a monitor, I was floored when I found out I'd have to copy 16 disks' worth of program files onto floppies so I'd have backups," says Kevin Myers, a computer repairer in Big Stone Gap, Virginia.

By Roberta Furger

PC World Consumer Watch editor Roberta Furger

According to hardware and software companies we spoke with, there are two principal ways that software gets shipped with systems: either preloaded on the hard disk (the most common option) or as separate shrink-wrapped packages that may or may not be installed, depending on the wishes of the customer.

With preloaded software, the PC manufacturer generally decides whether to include the floppies and all the original documentation. (Copies of Microsoft DOS and Windows, however, must include documentation and disks, says Microsoft product manager Richard Freedman.) For applications, Lotus and Microsoft—two companies that are aggressively pursuing bundling arrangements—require PC companies to either include the disks or provide some way for the user to get them. Dell, for example, provides a utility that walks the user through the process of copying program software from the hard disk to floppies. Other companies include postcards from the software

developer that users can return to request original disks (although you may have to pay extra for them).

Gateway, one of the first PC companies to offer bundled software, has established a unique arrangement with Microsoft. Customers get all the floppies, but all Microsoft software is identified as the Gateway 2000 version. According to spokesperson Mike Schmith, although the floppies and documentation look a bit different from the Microsoft-provided products, the application is the same.

Floppy disks and documentation are just two of the issues that buyers should ask about when ordering a software-equipped PC. The other big issues are registration and support—from making sure you're a registered user of the software to knowing who'll be on the line when you call for technical assistance.

Most PC companies include registration cards for each of the applications they ship with a computer (Borland, Lotus, and Microsoft require that a card be included). Sending in the completed card ensures that you're put on the software company's mailing list, so you'll get newsletters and upgrade notifications. It doesn't, however, guarantee that you'll get support from the software developer. That duty often falls to PC makers, which buy the packages from the software developers. (Details of these arrangements vary considerably, but companies essentially pay a fee for the right to resell software applications; they get the software at a discounted rate but are often required to provide support as a condition of the deal.) For DOS 6.0, PC companies are also required to include a registration card and a certificate of authenticity with each package. As with applications, though, registration doesn't get you support for DOS or Windows—that's the responsibility of the hardware company that sold you the products, says Freedman. Recognizing that customers aren't always able to get support through the PC maker, Microsoft also has a 900 number for DOS support and a toll line for Windows support.

Although software firms say they train the technical staff at hardware companies on all aspects of their packages, not everyone is thrilled with going to a PC company for software support. "I think it's a little troublesome to be married to a hardware vendor for all your software products," says Kevin J. Mooney, a programmer in Maitland, Florida. "I find it hard to believe that a hardware company would be as knowledgeable as the developer of an actual operating system or application software."

Mooney also worries that you may not always be getting the full application when it comes bundled with a PC. Companies we spoke with say that with a few exceptions,

What to Ask About Hardware-Software Bundles

- **Are floppy disks, manuals, and a registration card included?**
- **Is it the full-blown application or a "lite" version?**
- **Who provides software support?**
- **Who handles upgrades?**

Feet

Slumping, slouching or sagging posture while seated at your computer can be related to the position

© 1993 Ergodyne

the products are identical. The most notable exception is the often-bundled WinFax software from Delrina. Most WinFax bundles include WinFax Lite, not WinFax Pro 3.0. Among the 3.0 features missing from the Lite version: 101 fax cover pages, the cover page designer, the capability to annotate faxes, optical character recognition, and document management capabilities.

The Lite version, according to Delrina spokesperson Shelly Sofer, is intended only to provide basic send and receive capabilities. Most customers want the more advanced features, and Delrina offers an upgrade to WinFax Pro for $49.95 (the full package retails for $129). WinFax Lite is supposed to be supported by the hardware companies, but Sofer says Delrina won't turn customers away (a point repeated by every software company we contacted).

Hardware-software bundles can be a great deal. You get leading applications at a discount and generally don't have to bother with installing a bunch of software before you can begin using your new PC. But buyers should remember two cardinal rules when considering hardware-software bundles, says Microsoft product manager Jon Kechejian: Don't assume you'll get support from the software company, and, unless you've received a certificate of authenticity, don't assume yours is a legitimate copy of DOS. I'd add a third: Don't assume anything. Ask a lot of questions so you know what you're getting before you ever take the computer out of the box.

Christina Wood contributed to this article.

Shop Talk

The Mystery of the Pentium Upgrade

I ordered my 33-MHz 486DX computer from Insight Distribution Network, in part because the salesperson told me that the motherboard was fully upgradable to the then-upcoming Pentium processor. (In fact, he was so convincing that I chose Insight's system over many others.)

In late March of this year, after reading about the new Pentium chip from Intel in various computer magazines, I became suspicious of the upgradability of my purchase and called Insight.

Insight admitted that it had made false claims and offered to let me return the computer (though I would have to pay the shipping charge). I thought about sending it back, but since I was otherwise happy with the system and had over 195MB of information and programs on it, I declined.

Buyers should be aware, though, that so-called Pentium upgrades aren't all they're cracked up to be.

Mark E. Sadowski,
Dearborn Heights, Michigan

Editor's note: With the advent of the new Pentium technology, many consumers are asking if the system they're buying can be upgraded to the new, faster processor. And many hardware companies, for their part, are touting "Pentium upgradability" in their ads. In fact, there is no *true* Pentium upgrade path for typical personal computers. Many systems—including, says Insight, ▶

of your feet, so help avoid undue strain on your body with our fully adjustable foot rest.

Foot Rest

ergodyne WorkSmart

software for your hardware 1-800-323-0052

Circle 46 on reader service card

BUG WATCH

DOS 6.0

The DoubleSpace compression utility in DOS 6.0 is incompatible with the BIOS in some Sharp, Canon, and older-model Acer computers. In these systems, the computer locks up when DoubleSpace is installed. But since no compression has occurred at this point, no data is lost. And there is an easy work-around: Reboot your computer with a DOS 5.0 or 6.0 boot disk that does not have the file DBLSPACE.BIN on it. Then delete DBLSPACE.BIN (a hidden and read-only file) from the root directory of your C: drive. In DOS 6.0, type DELTREE C:\DBLSPACE.BIN. In DOS 5.0, remove the file's hidden and read-only attributes and type DEL C:\DBLSPACE.BIN.

Microsoft Corp.

206/646-5104 (available for first 90 days after purchase), 206/454-2030 (general technical support)

SoundBlaster Pro

A bug in the Windows 3.1 Virtual DMA controller causes bus timeout errors on some MCV SoundBlaster Pro–equipped IBM PS/2s. The bug affects only machines that are based on IBM's Micro Channel bus.

The current work-around is to start Windows in standard mode by typing WIN/S, exit, and restart in enhanced mode. Creative Labs and Microsoft are working on a new driver (available from Creative Labs) that should correct the problem.

Creative Labs

405/742-6622

—Gordon Ung and Christina Wood

Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with the broadest interest.

Gordon Ung is an editorial intern for PC World.

the one Sadowski bought—may be upgradable to the forthcoming Pentium-based OverDrive chip. The performance boost you get from that OverDrive chip won't match that of a "true" Pentium system. That OverDrive chip will work in 386- or 486-class PCs with the 238-pin OverDrive socket. To get full Pentium capabilities (including a 64-bit memory bus), you would need to buy a new, expensive motherboard—or a new PC.

As for Sadowski and Insight, Rick Rickert, Insight's director of client services, described the situation as a misunderstanding rather than a deliberate attempt to mislead the customer.

The Hassle of Taxes

Over the last few years, *PC World* has given high ratings to TurboTax software from ChipSoft. I, too, have found it to be great tax software, but the customer service and technical support departments are less than satisfactory.

This year I terminated my many years of involvement with ChipSoft. This decision

Hands

That kink you feel in your wrist from typing at your computer could lead to painful tendinitis or even carpal tunnel syndrome so help reduce the strain keyboarding puts o

© 1993 Ergodyne

was based solely on the company's inability to support the program in a timely fashion.
W. R. Johnston, North East, Maryland

Editor's note: We received several letters from ChipSoft customers who were unable to reach ChipSoft for help in filing their 1993 tax returns. According to ChipSoft spokesperson Diane MacKeeby, "There wasn't enough customer support staff to handle increased sales." She adds that ChipSoft is working to remedy this problem before the next tax season rolls around. "We've installed a new phone system, which can automatically answer commonly asked questions, and more than doubled the customer support staff," says MacKeeby. ChipSoft also offers technical support on a number of bulletin board services.

A Hollywood Ending

I recently had a very unpleasant experience with a happy ending. I placed an order with a mail-order company for a copy of Broderbund Software's Print Shop Deluxe. After cashing our check, the mail-order company went bankrupt. I called the Better Business Bureau and the attorney general's office and was told by all that nothing could be done.

I contacted Broderbund Software and explained the situation. I faxed the company a copy of my original order and a copy of the canceled check. The representatives were nice enough to send me a copy of the software free of charge, even though they had no obligation to do so.
Steven Farkas, Belle Harbor, New York

I Own It, But I Can't Touch It

I own a program I would not have bought if I'd known that the majority of its graphic images were on CD ROM. I'm referring to Micrografx Graphics Works.

In all its advertising, Micrografx ballyhoos the 10,000 photo images included with the program. However, the ads fail to state that a CD ROM drive is necessary to access most of the images. It isn't even clear on the box. I was appalled when I tried to use the images and found only a few available.
V. C. Cody, Portland, Oregon

Editor's note: Micrografx spokesperson Peter McLaughlin admits that, due to an oversight, neither the ads nor the packaging for Graphics Works made it clear that a CD ROM drive is required to access the images. When Micrografx realized the problem in April, it immediately clarified its ads and added stickers to the packages. According to McLaughlin, "Some packages—judging from Cody's experience—missed getting stickers." Micrografx is working with retail stores to correct this problem. McLaughlin offered Cody a full refund, but she opted to keep the program and is working with a friend to copy the images to disk. Micrografx will either provide technical support to people who want to get the images onto disk, or offer a full refund to those who want to return the program.

Shop Talk is researched and written by PC World *assistant editor Christina Wood. Think you've gotten a raw deal—or a great one?* Consumer Watch *wants to hear the details. We'll investigate complaints and publish letters with the broadest interest. See page 12 for contact information.* ■

our hands with our rounded, cushioned, height-adjustable wrist rest.

Wrist Rest

ergodyne WorkSmart

software for your hardware 1-800-323-0052

Circle 101 on reader service card

NEW FOR WINDOWS

Register now for the free Borland Office seminar. Call today, 1-800-553-6654. Co-sponsored by Egghead.

Dream Team

The #1 picks in Windows software

1 Best Word Processor:
New WordPerfect for Windows version 5.2 is a better, easier, and more powerful version of the best-selling original.

2 Best Database:
Paradox for Windows is the easiest to use, most powerful, and most reliable relational database.

3 Best Spreadsheet:
Quattro Pro for Windows combines revolutionary ease of use with powerful new analytical tools and outstanding 1-2-3 compatibility.

Limited-time offer. Special upgrade price!

$299.95 U.S.

Offer available while supplies last!

Introducing the Borland® Office for Windows—an unbelievable deal on the three best Windows programs, all in one package! If you own any Windows or DOS word processor, spreadsheet, or database, this is your ultimate upgrade. ■ WordPerfect,® the world's most popular word processor and winner of *BYTE*'s Readers' Choice Award; Paradox® for Windows, the easiest-to-use relational database and winner of *PC Magazine*'s Editors' Choice Award; and Quattro® Pro for Windows, the spreadsheet that just won *InfoWorld*'s Product of the Year Award. ■ Don't miss the chance to purchase at this special upgrade price.

1992 BYTE READERS' CHOICE AWARD
WordPerfect for Windows 5.2
June, 1992

PC MAGAZINE EDITORS' CHOICE
Paradox for Windows
May 11, 1993

INFO WORLD 1992 PRODUCT OF THE YEAR
Quattro Pro for Windows
April 26, 1993

90-day, money-back guarantee!

See your dealer or call now, 1-800-336-6464, ext. 7014

In Canada call, 1-800-461-3327.

Borland
Power made easy

Special introductory price is $399.95 for first-time buyers. Copyright © 1993 Borland International, Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. WordPerfect is a registered trademark of WordPerfect Corporation. Offer good in the United States only. All prices in U.S. dollars. All orders subject to availability. B1 5811

Circle 13 on reader service card

In Pursuit of the Green PC

Can you preserve the environment, improve working conditions for your employees, and still save money? Surprisingly, the answer is yes. This month, Rick Barry, a consultant at the World Bank in Washington, D.C., explains how they set about purchasing PCs and related products that are friendly both to employees and to the environment—and how the bank's strategy is paying off in reduced energy costs. —*Ed.*

Most of us have concerns about our environment—the water we drink, the air we breathe, the food we eat—and many of us are accepting more responsibility for the quality of our lives and surroundings. At the World Bank we've found that creating an environmentally and ergonomically sound workplace also makes good business sense—though it's almost as big a project as trying to protect a Sumatran rain forest.

Our main complex in Washington, which we're currently replacing, is a perfect example of an outdated office. It consisted of half a dozen adjacent buildings acquired over 20 years, beginning in the 1940s. The offices were designed to accommodate a maximum of 3500 people.

In the late 1970s, our increasing use of computers, fax machines, and printers began straining the power and cooling capacity of these buildings. In 1977, only 1 in 100 employees used a PC. By 1980, that number had risen to 1 in 25. By 1983 it was 1 in 4, and by 1987 all employees had their own PCs.

Since the average PC emits more British thermal units of heat than a human being, this increasing use of computers severely taxed the building's electrical and cooling systems. In fact, installing 1000 PCs created an electrical demand equal to what 2500 additional people would cause, costing on average an additional $30,000 a month.

That was only the tip of the iceberg. Even after we spent more money on cooling systems, employees began to complain about excessive heat, static electricity shocks, eyestrain, and headaches. We also had power overloads on certain floors where computer equipment was concentrated.

A Well-Lighted Place

In 1990 we envisioned a safe, environmentally healthy, people-friendly workplace, in which energy-saving PCs would play a large part. We concluded that as a first step, we would have to replace a large part of the original main complex and turn it into a single building. The old buildings had fallen below the changing fire and safety standards and contained asbestos, and the cost to upgrade would have been prohibitive. Because the new buildings offered a potential energy savings of $400,000 per year (not including the savings for energy-efficient PCs), we decided to rebuild.

Today, we've finished the first phase of a six-year construction project designed to house about 5000 World Bank employees on the same site. With its natural lighting, ergonomic furniture, and easy-on-the-eyes matte wall and floor finishes, the new building is designed both to save energy and to provide a high-quality working environment for World Bank staff.

Environmental Purchasing Criteria

Once we decided to build new offices, persuading management to purchase energy-saving, low-emission technology was relatively simple. That's because we estimated saving as much as $250,000 per year in power and cooling costs for the computers alone.

Rick Barry, a consultant at the World Bank in Washington, D.C.

In equipping our new offices, one of our most important concerns was reducing energy use and electromagnetic field, or EMF, emissions. Although evidence is still inconclusive, EMF emissions are suspected of contributing to higher leukemia, brain cancer, and miscarriage rates among workers. So we designed the building's power and lighting systems to mitigate EMF emissions while significantly improving energy conservation. The next step is to apply the same philosophy to office equipment. When we procure desktop computers, we make sure our staff can opt for workstations—monitors in particular—that comply with the strict emissions standard of some European countries (notably Sweden).

Many U.S. companies now belong to the Environmental Protection Agency's Energy Star Computers Program. Members of the program, such as Apple, Compaq, Digital Equipment, Dell, Hewlett-Packard, IBM, and others, commit to developing systems that

MANUELLO PAGANELLI

AnthroCarts®!

AnthroCarts will knock your socks off! Imagine how great it'll be when you find the perfect furniture for your equipment — just the right size, tough as nails construction and dozens of accessories.

And you'll find our service so real and responsive, you'll get a kick out of ordering direct!

Call for a free catalog!

Lifetime Warranty.

Adjustable for all sizes.

Lots of choices.

ANTHRO®

800-325-3841

3221 NW Yeon St.
Portland, OR 97210
Fax: (800)325-0045

GSA contract no. GS-OOF-5040A. Available for OEM applications. Prices from $159.00
Anthro, AnthroCart and Technology Furniture are registered trademarks of Anthro.

reduce power requirements to 30 watts or less. These systems reduce power consumption and EMF emissions by entering a sleep mode after a set period of inactivity, or by incorporating quiet, energy-conserving heat sinks, like those used in space vehicles, in place of noisy fans.

All other things being equal, we tend to favor companies with a demonstrated commitment to the environment. We appreciate, for instance, the efforts of one major chip manufacturer to improve its chip-soldering practices. The new methods promise to reduce the amount of chlorofluorocarbons (CFCs) released into the atmosphere from 600,000 pounds a year in 1991 to zero by the end of 1993.

Another ongoing goal is to buy products with recyclable parts, such as printers and plain-paper fax machines with recyclable toner cartridges. We strongly favor computers with replaceable components such as reusable chips and boards. And we prefer to buy from vendors who pack their products in recycled cartons or—better yet—in reusable containers.

Our environmental philosophy extends to other strategies, such as sending electronic mail whenever possible to save paper. With every staff member's help, we also recycle used paper, and we purchase recycled paper for printing and copying. We are exploring a document management system that will allow us to store electronic images of documents rather than their paper forms.

Insist on It

Many manufacturers are offering products that meet our specifications, so we can be choosy. Some of this equipment is expensive. Swedish-standard monitors, for example, cost up to $100 more than other displays. We believe that savings in energy costs will defray additional expenses. After calculating the cost of reconstructing our buildings, purchasing new equipment, and implementing energy-saving strategies, we estimate we'll receive a return on investment of 18 percent.

If your company is like most, you probably aren't planning to replace your computers or buildings. Fortunately, you can increase employees' comfort without running up huge expenses. To reduce heat, avoid overcrowding in office areas, especially if you have a lot of equipment. Place

MediaMagic™. The Trick to Mastering Multimedia.

A family of audio boards that perform like magic.

Looking for the ultimate in multimedia sound? Then take a look at what we have up our sleeves. Introducing MediaMagic, a family of Digital Signal Processor (DSP) audio boards and sound systems that bring superior concert-hall sound to your PC.

Whether you need an inexpensive solution for professional digital sound, or a total sound solution with wave table sampling, state-of-the-art, real-time MPEG II audio-data compression, packaged with high-performance SCSI CD-ROM drive, high quality speakers and popular CD-ROM titles, MediaMagic delivers. And if you think that sounds good, you'll really enjoy hearing about MediaMagic's 16-bit digital stereo playback and recording capabilities with full mixing and editing features which add new dimensions to business presentations, educational programs and computer games. What's more, MediaMagic audio boards support MIDI to enhance your applications for original music creation.

Products:	Digital Audio	Up-grades	Wave Table	CD ROM	Real-Time MPEG Audio
MediaMagic DSP-16 Plus	16-bit 48 Khz	Yes	Standard	SCSI	Yes (encode/ decode)
Sound Blaster 16 ASP	16-bit 44 Khz	Yes	Optional	Propri-etary	No
ProAudio Spectrum-16	16-bit 44 Khz	No	No	No	No

All MediaMagic products are compatible with Windows Sound System applications and DOS-based Sound Blaster™ games providing total compatibility with all current sound applications on the market today.

MediaMagic audio boards are a snap to use, featuring plug and play operation. No complicated switch settings. No jumpers. No kidding.

Our open architecture lets you add more advanced features and technologies as you need them, while other sound boards just become obsolete.

For additional information call our toll-free number below:

1-800-624-8654

European and Asian inquiries call IPC, TEL 65-744-2688 • FAX 65-287-6806

MEDIAMAGIC

AUSTIN
AN IPC COMPANY
10300 Metric Boulevard • Austin, Texas 78758

© 1993 MediaMagic. All other product or brand names are property of their prospective companies

Circle 20 on reader service card

How did Kao diskettes become so dependable?

It's as easy as 1-2-3.®

Lotus® demands the ultimate in diskette quality – it chooses Kao. And the fact that we test and certify every single diskette has a lot to do with it. Count on Kao diskettes, the professional choice.
Call us at **1-800-759-2590.**

KAO®
EXTREME QUALITY

Made in the U.S.A.

Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation
KAO is a registered trademark of Kao Corporation
© 1993 Kao Infosystems Company

Circle 138 on reader service card

shared items such as printers and fax machines where people don't work all day.

Also, encourage people to turn off equipment, such as EMF-emitting monitors, when not in use. Turning off PCs at night and on weekends can save $40 to $100 per year for each PC, depending on the cost of power where you work.

If you need new equipment, put your environmental criteria into your RFP, and buy from vendors in programs such as the EPA's Energy Star Computers Program. If you work for a small company that's purchasing from a superstore, enlist the salespeople's help, and give them the sale if they find the products that meet your standards. Also, purchase from vendors that have demonstrated a commitment to improving the environment.

Until we all insist on higher-quality, ergonomically and environmentally sound products, many vendors will treat them as a costly option. But your dollar can make a difference. Until a few years ago, vendors treated such standard items as adjustable keyboards, displays, and nonreflecting matte finishes on PCs as extras. Now, no manufacturer would dare produce a PC without these features.

Note: For a list of manufacturers enrolled in the EPA's Energy Star Computers Program, contact Brian Johnson at 202/233-9230. To receive a copy of Rick Barry's personal checklist of purchasing criteria for ergonomically and environmentally friendly products, see PC World Online.

Edited by Bronwyn Fryer

If you use PCs to manage people and other resources in a business environment, Real Problems, Real Solutions *wants to hear from you. See page 12 for contact information.* ■

POWERTIP no.292

Retrieving Title Bars

Should you ever accidentally move a window's title bar beyond the top of the screen and find you can't retrieve it, press <Alt><Space>M, and then <Down> until the title bar reappears.

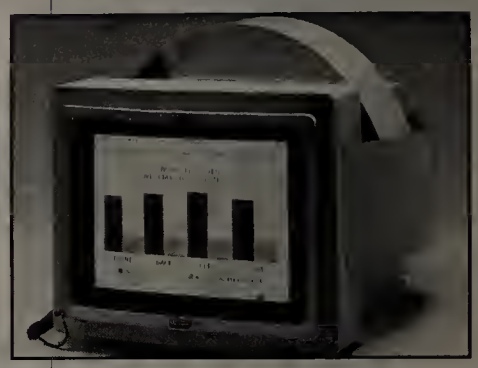
Windows Special Interest Group
Capital PC User Group
Washington, D.C.

PROBLEM:

Monitor Radiation

SOLUTION:

NoRad Shielding



ELF ProTech

- First and only external ELF magnetic radiation suppressor
- Absorbs up to 70% of ELF magnetic radiation all around the monitor

NoRad Shield

- Blocks all electric and high-frequency magnetic radiation—more than any other screen
- Ends glare, reflections, static

NoRad UltraGlass

- Most radiation protection available from a glass filter
- Superior optical clarity, ends glare

Call now to find out how you can limit your exposure to VDT radiation.

1-800-262-3260

NoRad

1160 E. Sandhill Ave., Carson, CA 90746
(310) 605-0808 FAX: (310) 605-5051

Circle 175 on reader service card

Do You Know Where Your Signature Is?

Sign right here... You reach for your pen automatically. A signature—sealing the deal—is a vital component of nearly all business transactions.

Yet as our world of checks, contracts, and credit cards becomes increasingly computerized, affixing your signature to a nonpaper document can be a test of your computer skills. I frequently "sign" computer fax transmissions with a PCX file of my scanned-in signature and let the recipient's attorneys wrangle over how binding such an image may be. As a result, I'm using my PC not only for words and numbers but for images. And I suddenly find myself mired in the problems associated with handling and storing image files.

Business Fixtures looks at various solutions this month: The Inforite MP100 Writing Pad is a signature tablet reminiscent of the original *Star Trek* that plugs into a serial port to capture your handwritten input. The Windows-based AceFile 2.0 lets you easily add graphics files to your database reports, and start-up product Watermark Discovery is a full-featured graphics image-management system. Due to the taxing space requirements of graphics images, I also tried out a 120MB magneto-optical (MO) drive, Panasonic's LF-3000.

Inforite MP100 Writing Pad

If you've signed for a United Parcel Service (UPS) delivery recently, the Inforite Writing Pad will feel familiar. UPS has more than 60,000 AS1050 computer clipboards (also developed by Inforite) that let you write directly on the unit's surface with a stylus to affix your electronic signature.

The MP100 Writing Pad brings this technology into your office. It's a new kind of input device—complete with DOS and Windows software—that captures your handwriting digitally, storing it as an image file. No more crippling your writing hand signing the multiple pages of, say, a mortgage application. You could review the documents on screen, make a few revisions, attach your digital signature, and E-mail the whole package to your banker.

What a great idea, right? Well, I thought so, too—until I spent several hours working with the MP100. First, the Writing Pad's output doesn't *look* like my signature. My signature is loopingly distinctive, and, I think, quite legible. I've never had a problem verifying that the scrawl was mine. Not so with Inforite's output, which my wife described as "arthritic."

And do you want your signature in a file somewhere, ready to be reused? How do you retain control of that computerized image once you've given it away? I don't know, and neither do you. Fortunately, the MP100's version of my signature is sufficiently non-Foulksy that I could easily deny it was mine.

The problem is, the tablet is hard to write on: The front of the pad, where the side of your hand rests, slopes awkwardly downward. And the writing surface is sunken, slippery, and without visual feedback. Hence, you write by reflex because you can't see what you're writing (except on the PC screen).

Of course, given the inherent dangers of distributing computerized signatures, maybe the Writing Pad's inability to capture my autograph is a plus. Still, I'd prefer a flat surface design to make the MP100 more usable—not an unreasonable expectation for a $299 product.

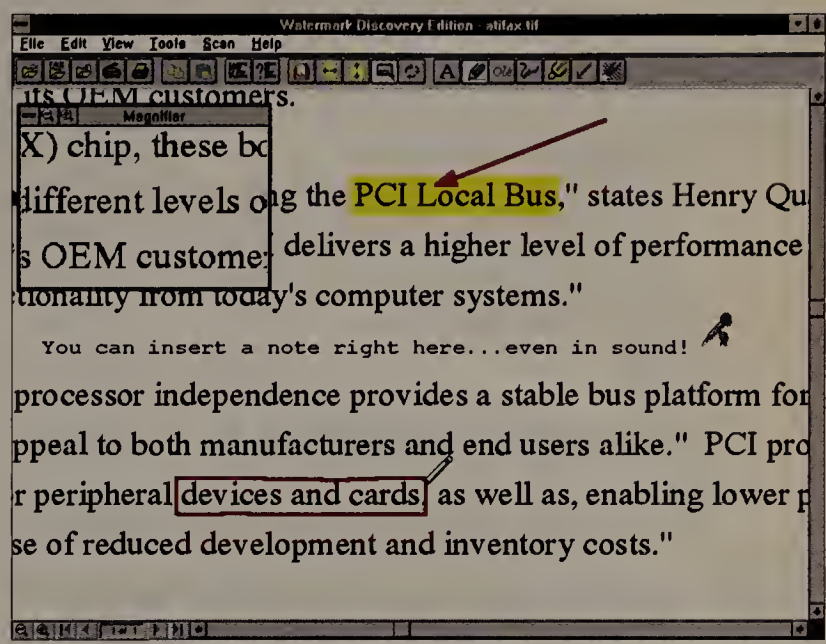
AceFile 2.0

A year ago, an overly long meeting (I was the speaker) delayed me for an appointment with a would-be client. I was to help her set up a Windows database system with AceFile 1.0. I say "would-be" client because by the time I arrived, she had already accomplished 90 percent of the setup and printed her first report. I was out of a job.

AceFile *is* that easy. Version 2.0 provides context-sensitive help; offers six ready-to-use applications; and invites image-handling (PCX, BMP, and TIFF) glamour for its report, label, and forms output. Yes, you can print your business logo on a mailing list without having to mail merge using a word processor.

AceFile 2.0 has a series of templates that make it simple to get up and running. They include an order/inventory system, an employee record system, a sales lead tracker, and a personal organizer (with auto-dial support).

The new version of AceFile has features that mimic relational capabilities. It lets you join and relate information in two or more data tables so you can



FOULKS' FAVORITE: Watermark Discovery is an image-management solution that lets you add images and even verbal comments to your document.

ALSO FEATURED THIS MONTH: Inforite MP100 Writing Pad • AceFile 2.0 • LF-3000 Magneto Optical Drive

By Thom Foulks

search for information in more ways and across tables. Since you don't have to copy tables, you also cut down on storage overhead—a plus when you're dealing with images.

Pick up AceFile this morning for about $110 on the street, and you can have it working by this afternoon.

Watermark Discovery Edition

Document managers—products that aim to replace filing cabinets and paper documents with computerized images of the paper originals—have long been in the realm of expensive hardware-software solutions. But Watermark Discovery Edition, a major new entrant into this category, is an inexpensive software solution that's simple to use.

"How do you retain control of a computerized image once you've innocently given it away? I don't know, and neither do you."

You might wonder if such paper-centric professions as law, medicine, and accounting are eagerly awaiting such products. I find it hard to visualize computer-based court filings or a doctor carrying a patient's charts on a notebook computer instead of a clipboard.

No matter. Watermark stands bravely ready to provide a panoply of document-management tools. It offers built-in support for scanners (it is TWAIN-compliant) and computerized faxing (via a module that works with Delrina's WinFax Pro) and carries the OLE (Object Linking and Embedding) powers of Windows 3.1 to heights likely not anticipated even by Microsoft. Watermark makes it possible to add images to Windows applications that previously couldn't handle them. And it translates images to text (optical character recognition) and inserts them into your Windows word processor via a separately installed Wordlinx package from Ocron.

You might ask why you would need to do all this. Well, you could plug the fax image of a sales report into your Quattro Pro for Windows spreadsheet that tracks sales activity. Or embed a scanned photo of a home for sale into the Word for Windows document that lists the features of the home. Or attach your signature image to an E-mailed contract and electronically close the deal in a matter of seconds.

When your boss reads the Quattro Pro spreadsheet on her screen (she must also have Watermark installed), a Watermark logo is displayed where you inserted the image. All she does is double-click the logo to display the image.

These general capabilities already exist within OLE-compliant Windows software. What Watermark adds is the ability to edit and manipulate the original image file more easily. You can add notes to the sales report fax or draw arrows pointing to key features of the home photo. If you have a sound card, you can even add a verbal comment to the E-mailed contract.

To help keep track of your images and documents, you can attach properties to them. For instance, if you attach keywords and subject information to a document, you can later search for these elements to find the document or round up a group of documents with similar properties.

A version expected later this year, Watermark Professional Edition, promises to add support for optical storage and jukeboxes and the ability to create folders of documents that can in turn be included in other folders.

Watermark is a well-designed product, but it's the price that makes it a Foulks Favorite. At $149 it's a bargain, even if you use it only to handle incoming faxes. I'm putting it right to work.

LF-3000 Magneto Optical Drive

Don't be spooked by the $2195 suggested retail price of this built-like-a-battleship external MO drive. When last we looked, its street price had fallen to around $1200. That puts it in the same ballpark as other solid performers rated by *PC World* (see the review "MO Drives: Storage for the Masses").

The LF-3000 requires a SCSI controller and cable. If you don't have these components, you can purchase an Adaptec-prepared kit ($529) from Panasonic. My kit was the LF-S016AT, replete with Adaptec's AHA-1540B adapter, software, manuals, and installation pamphlets for DOS, Windows, Novell NetWare—a package intended to cover all possibilities. Even the CorelSCSI utilities were included.

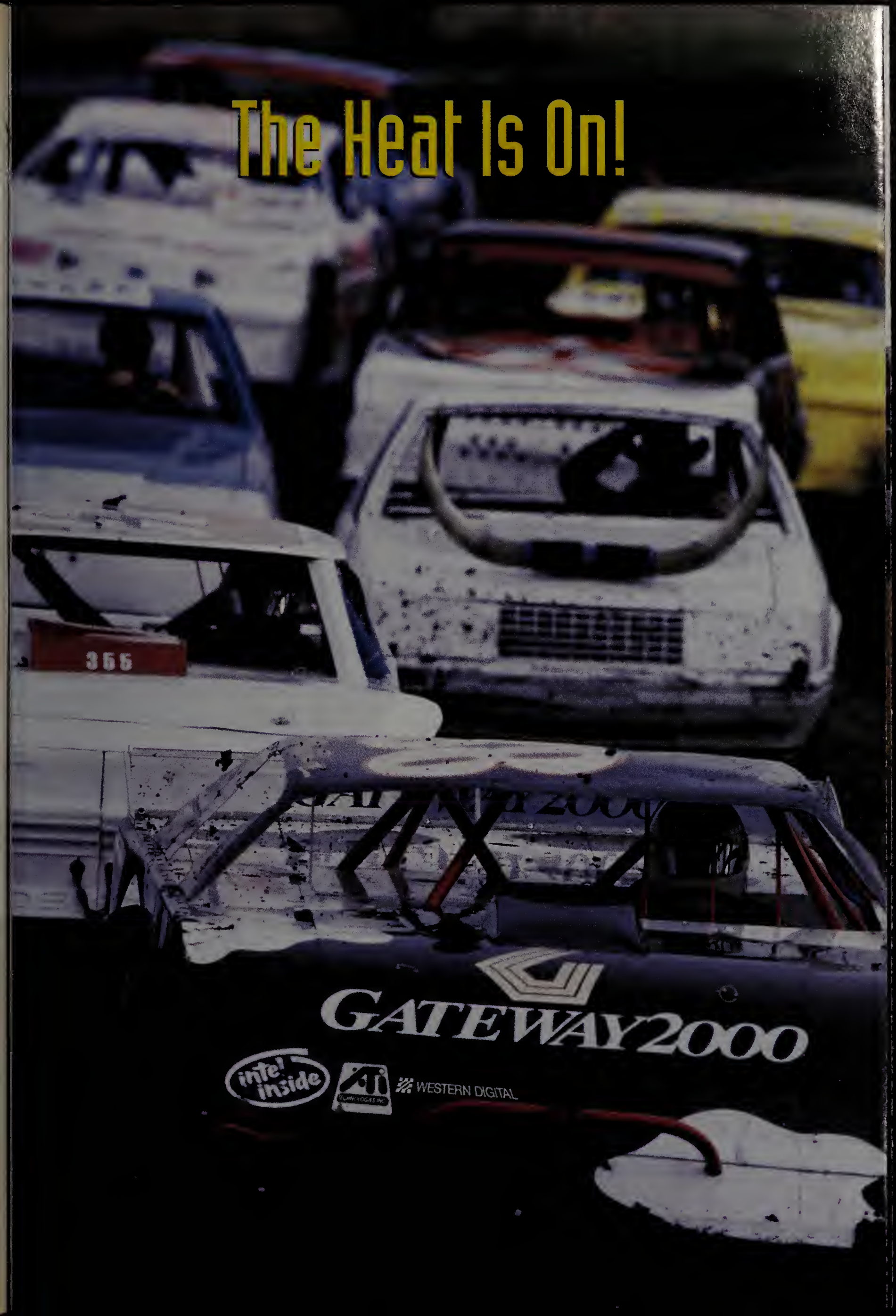
Despite all the reading material, I used only one small installation guide to hook up the drive. The default settings of the jumpers on the adapter card were correct for my system; it seemed impossible to attach the cable incorrectly, and the drive's power-on switch is on the front panel. Plus, I was impressed with its solid feel and durability.

Few MO drives can be considered speed demons, and the LF-3000 isn't likely to zoom past any checkered flags. In April, I wrote about transferring 13.8MB of files, 453 total, to an MSI Cachét MO drive. It took 3 minutes, 33 seconds. The Panasonic unit, attached to the same system, required 5 minutes, 45 seconds, to XCOPY 13.7MB, 440 files, from a hard drive to the MO's 128MB cartridge.

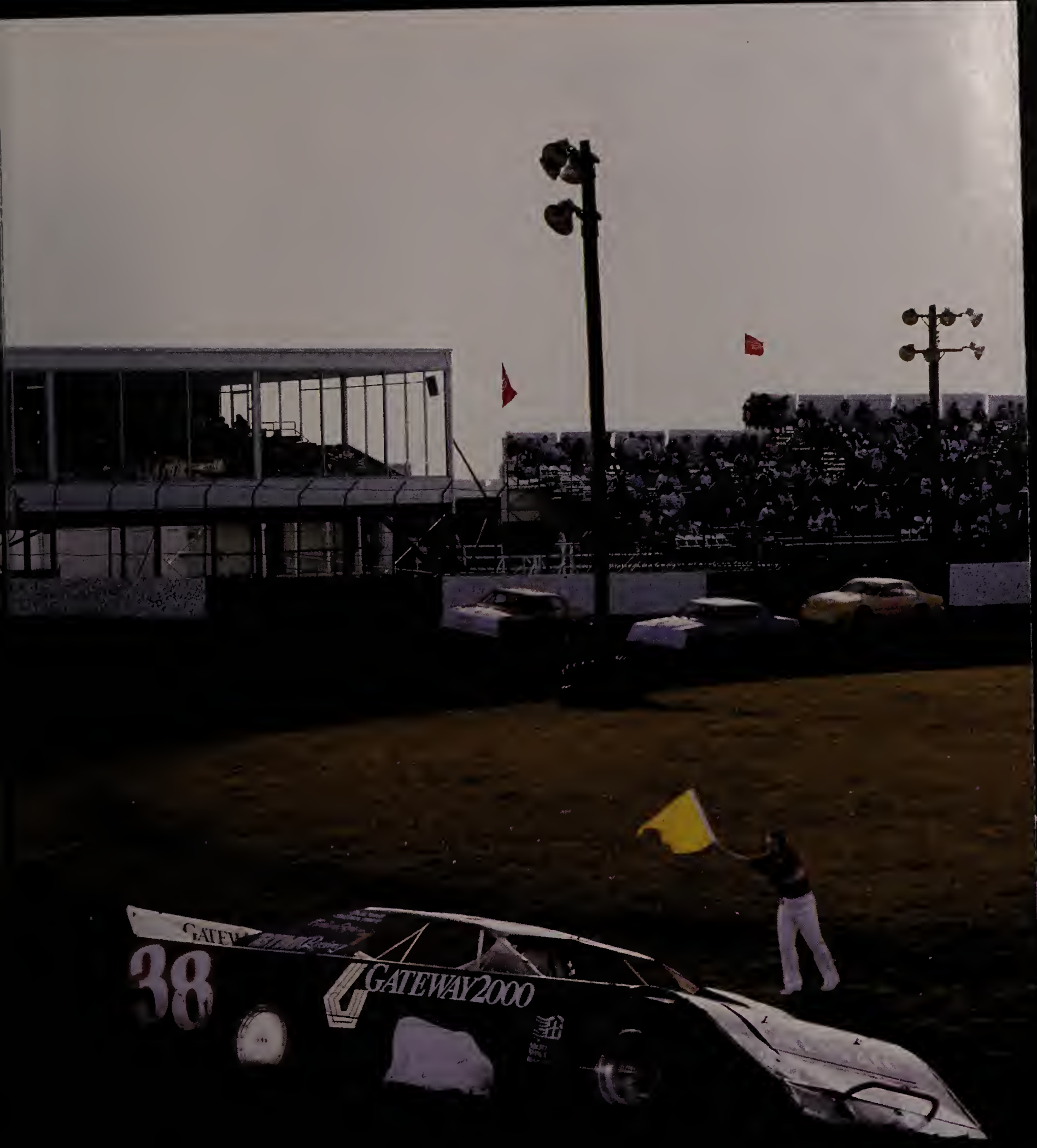
But then I removed that cartridge and inserted another $55 128MB cartridge. It was instantly ready for use. No removable mass media storage system can match the ease of use of the MO systems, and as graphics images become more common and places to store them become more necessary, MO is the best here-and-ready answer.

- **AceFile 2.0**
  Ace Software Corp.
  800/345-3223, 408/451-0100
  Reader service no. 765
- **Inforite MP100 Writing Pad**
  Inforite Corp.
  800/366-4635, 415/571-8766
  Reader service no. 766
- **LF-3000 Magneto Optical Drive**
  Panasonic Communications & Systems Co.
  800/742-8086, 201/348-7000
  Reader service no. 767
- **Watermark Discovery Edition**
  Watermark Software, Inc.
  617/229-2600
  Reader service no. 768

Thom Foulks is a contributing editor for PC World.


The Heat Is On!
366
GATEWAY2000
intel inside
ATI TECHNOLOGIES INC
WESTERN DIGITAL

They're In Hot Pursuit Of The Value Leader...


38
GATEWAY2000

But Gateway Outmaneuvers The Competition — And You Win!

In the fast-moving, hard-driving PC industry, the race for leadership is more competitive than a heat at your local stock car speedway. All classes of PC manufacturers are on the direct market track together, trading paint and slamming each other into the wall at every turn. Competitors big and small are being black-flagged and sent to the pits in record numbers this year.

All the while, season after season, the unassuming cow-spotted Gateway car consistently outmaneuvers and overpowers the competition. Repeatedly, Gateway 2000™ leads the field by providing you with the best value in the PC industry. When Gateway takes the checkered flag, you're the winner!

carefully maintained our unique, low-overhead business model with no extra parts to slow us down. The Gateway machine handles extremely well, too. We can move faster through the marketing corners without getting out of control, all of which saves you money when you buy from Gateway.

Our competitors would like to have you think they're now offering a value that meets or beats Gateway. But apples to apples, they're still hundreds, sometimes thousands of dollars more, while our systems consistently outperform theirs.

You're a smart shopper. Do the comparisons yourself and you'll confirm what Dataquest™ found in a 1993 customer satisfaction survey: Gateway ranked number one for best pricing. When you add the other buying criteria that's important to you, Gateway offers an unbeatable value.

What's The Winning Formula?

The driving strategy behind Gateway's success is simple: *understand what customers want and give it to them!*

Price

We understand you want the best possible price — and that's easy for Gateway. Like a winning stock car, we have the right combination of power, weight and handling to lead the price field.

We have the power to buy the highest quality components in huge volume at considerable savings, which we always pass on to you. Even though we're now one of the largest PC makers in the U.S. and a Fortune 500 company, we haven't let our weight get out of control (unlike some competitors). We've

intel inside

GATEWAY 2000

"You've got a friend in the business."®

800-846-2065

Gateway 2000's summer fun ad was inspired by our stock car racing team. As you might guess, we don't spend millions on an Indy car. Ours is an all-employee team that runs on local dirt tracks. The team races pretty much the same way Gateway operates: they're competitive and successful, but they always have fun!

Gateway Gives You More Horsepower.

Performance

We understand you want the best computer performance your money can buy. That's what you get with Gateway. We hold the track record in the biggest bang-for-the-buck division.

Take our 4DX2-66V system, affectionately known as the Big Kahuna, for example. In automotive terms, this system is a top fuel dragster. It has won 11 major industry awards, and they just keep coming because the 4DX2-66V includes the best of everything at a terrific price.

Another example of outstanding price and performance is our new line of ColorBook and HandBook®486 portables. They're colorful sprint cars sure to win the upcoming notebook races! Look for them in other Gateway ads in this magazine.

That's the Gateway price-performance ratio, and it's equally good across our entire product line.

Latest-Generation Graphics

Our price-performance ratio is even better this month thanks to improved graphics on our highest performance systems. We replaced ATI's Graphics Ultra Pro, the industry's leading graphics card, with ATI's latest-generation Graphics Ultra XLR. The new XLR is up to twice as fast as the Ultra Pro, and it's the best all-around DOS and Windows™ video performer in the industry.

The ATI™ Graphics Ultra XLR is also multimedia ready, enhancing and accelerating video for Windows through hardware. When viewing motion video, you can enlarge your window size to full screen without decreasing your frame rate, getting jaggy edges, color distortion or losing audio sync.

Compatibility & Upgradeability

We understand compatibility and upgradeability are important to you. You can relax with Gateway. When Dataquest asked 833 PC users in Fortune 500 companies to rate personal computer companies, they ranked Gateway number one in the areas of compatibility, upgrade potential and price. All Gateway systems go through extensive compatibility testing to ensure flawless performance with all products from major software developers and peripherals manufacturers. And we give you a *written guarantee* that our 486 systems are upgradeable to Pentium technology. Ask us about it.

intel inside

GATEWAY2000

"You've got a friend in the business."®

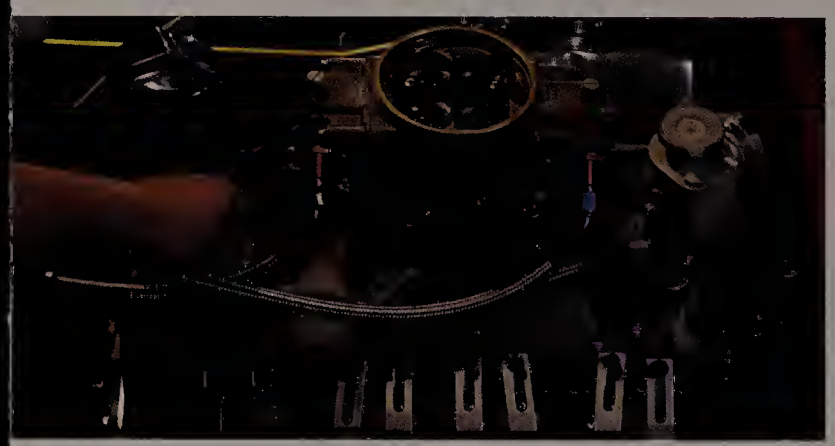
800-846-2065

Mike Schmith, Gateway 2000 Marketing Manager, drives the Gateway race car. "Schmitty" says the race to market with the very best products for Gateway is even more intense than his weekends behind the wheel.

Gateway's Award-Winning Team Is Behind You All The Way.

Reliability & Quality

We understand you want reliability and quality, in both the products you buy and the company you buy them from. That's what you get with Gateway. In the **three** most recent reader surveys conducted by *PC Magazine*, Gateway systems received the highest ratings for reliability. We earn these awards because we use only the best quality components in our computers, and they're manufactured with Midwest pride and painstaking quality-control procedures. Gateway 2000 is also one of the most financially stable companies in the industry, assuring you that you're buying from a reliable manufacturer that can withstand the rigors of the PC Racing Series.



Service

We understand you want the best in service, from your first phone call through the years you own your computer. You can count on Gateway to live up to your expectations. Our Midwest representatives are friendly, caring folks. You'll feel right at home with Gateway.

Every Gateway 2000 system comes with excellent after-the-sale support. You get a 30-day money-back guarantee. If you don't like your system, send it back within 30 days for a refund.

All systems come with a one-year limited warranty and telephone technical support for the life of the system. When you need help with your PC, whether it's not working or you just have a question, you want a fast, skilled crew waiting for you in the pits. That's what you get with department. We received *PC World's* World Class Award in 1992 for best service and support in the hardware category. In February and again in July of 1993, *PC Magazine* readers gave Gateway excellent ratings for service and reliability. And in June, *BYTE* readers echoed the other awards, choosing Gateway 2000 as the company that provides the best service in the industry.

intel inside

SERVICE • RELIABILITY • READERS' CHOICE • PC MAGAZINE

PC WORLD SERVICE EXCELLENCE AWARD

1993 BYTE READERS CHOICE AWARD Best Service

If you'd like to read our guarantee and warranty, please write to us and we'll gladly send you a free copy.

GATEWAY 2000

"You've got a friend in the business."®

800-846-2065

Brent Culbertson, a Gateway 2000 Tech Support Supervisor, is Crew Chief on the race team. He spends weekends keeping the Gateway car running, weekdays keeping your systems running.

Gateway 2000's Fast PCs

- 25MHz 486SX Intel® Processor
- 4MB RAM
- 3.5" Diskette Drive
- 170MB 13ms IDE Hard Drive
- Intel Pentium™ Technology Ready
- Windows Accelerated Video w/512K DRAM
- 14" Color CrystalScan® 1024NI
- Mini Desktop Case with Password Protection
- 5 16-Bit ISA Slots
- 124-Key AnyKey® Keyboard & MS Mouse
- MS-DOS® 6, Diagnostics & Windows™
- MS Works for Windows™ 2.0

$1295

- 33MHz 486SX Intel Processor
- 4MB RAM
- 5.25" & 3.5" Diskette Drives
- 212MB 13ms IDE Hard Drive
- Intel Pentium Technology Ready
- Windows Accelerated Video w/ 512K DRAM
- 14" Color CrystalScan 1024NI
- Mini Desktop Case with Password Protection
- 5 16-Bit ISA Slots
- 124-Key AnyKey Keyboard & MS Mouse
- MS-DOS 6, Diagnostics & Windows
- MS Works for Windows 2.0

$1495

- 33MHz 486DX Intel Processor
- 8MB RAM, 64K Cache
- 5.25" & 3.5" Diskette Drives
- 212MB 13ms IDE Hard Drive
- Intel Pentium Technology Ready
- Windows Accelerated Video w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Mini Desktop Case with Password Protection
- 5 16-Bit ISA Slots
- 124-Key AnyKey Keyboard & MS Mouse
- MS-DOS 6, Diagnostics & Windows
- MS Works for Windows 2.0

$1795

4DX-33V

- 33MHz 486DX Intel Processor
- 8MB RAM, 128K Cache
- 5.25" & 3.5" Diskette Drives
- 340MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- Windows Accelerator w/ 1MB DRAM on VL-Bus™
- 14" Color CrystalScan 1024NI
- Desktop Case (Tower Upgrade) with Password Protection
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard & MS Mouse
- MS-DOS 6, Diagnostics & Windows
- MS Works for Windows 2.0

$1995

4DX2-50V

- 50MHz 486DX2 Intel Processor
- 8MB RAM, 128K Cache
- 5.25" & 3.5" Diskette Drives
- 340MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- ATI™ Ultra XLR Video w/1MB VRAM on VL-Bus
- 15" Color CrystalScan 1572FS
- Desktop Case (Tower Upgrade) with Password Protection
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard & MS Mouse
- MS-DOS 6, Diagnostics & Windows
- Choice of Application Software

$2295

4DX2-66V

- 66MHz 486DX2 Intel Processor
- 16MB RAM, 256K Cache
- 3.5" Diskette Drive, CD-ROM & System CD
- 424MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- ATI Ultra XLR Video w/1MB VRAM on VL-Bus
- 15" Color CrystalScan 1572FS
- Desktop Case (Tower Upgrade) with Password Protection
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard & MS Mouse
- MS-DOS 6, Diagnostics & Windows
- Choice of Application Software

$2995

- 66MHz 486DX2 Intel Processor
- 16MB RAM, 256K Cache
- 5.25" & 3.5" Diskette Drives
- 500MB 11ms SCSI Hard Drive
- 32-Bit EISA SCSI Controller
- Windows Accelerated Video w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Tower Case with Password Protection
- 8 32-Bit EISA Slots
- 124-Key AnyKey Keyboard & MS Mouse
- MS-DOS 6, Diagnostics & Windows
- Choice of Application Software

$3495

- 66MHz 486DX2 Intel Processor
- 8MB RAM, 128K Cache
- 3.5" Diskette Drive, CD-ROM & System CD
- 340MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- Windows Accelerator w/1MB DRAM on VL-Bus
- 15" Color CrystalScan 1572FS
- Desktop Case (Tower Upgrade) with Password Protection
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard & MS Mouse
- MS-DOS 6, Diagnostics & Windows
- MS Multimedia Works, CD-ROM Edition

$2495

If a system comes with "choice of application software," choose one of the following packages:

- Microsoft Works for Windows™
- Microsoft Excel for Windows™
- Microsoft Word for Windows™
- Microsoft Word and Bookshelf '92,® CD-ROM Edition
- Microsoft PowerPoint for Windows™
- Microsoft Project for Windows™
- The MS Entrepreneur Pack
- Borland Paradox® and Quattro Pro® for Windows

All hard drive sizes are manufacturer's specified capacities. Microsoft MS-DOS 6 can increase hard drive capacity through software compression.

intel inside

Caviar

GATEWAY2000

800-846-2065

Printed on recycled paper with soy inks.

MICROSOFT® WINDOWS™ READY-TO-RUN

610 Gateway Drive • P.O.Box 2000 • North Sioux City, SD 57049-2000 • Phone 605-232-2000 • TDD 800-846-1778 • Fax 605-232-2023 • FaxBack 605-232-2561
Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (Central Time)

This ad is dedicated to the memory of NASCAR-driver Davey Allison from all his fans at Gateway.

And PC Racing Accessories

Software Upgrades

Microsoft Office™ — You can upgrade from a choice of application software to Microsoft Office, CD-ROM version, for only **$99**! This single package has all the leading Windows applications: Word, Excel and PowerPoint. The standard edition of MS Office is also available as an upgrade from a choice of application software for **$175**, or **$499** as a second application.

Choice of Application — If the system you want comes with MS Works for Windows, you can upgrade to a choice of application software for only **$100**.

Peripherals

Multimedia Upgrade Kit

Everyting you need to add multimedia to your PC is included in this specially priced kit! You get:

Sound Blaster™ 16 ASP Sound Card. Simply the best sound card available! This 16-bit PC audio card offers CD-quality sound, Yamaha® FM music synthesizer, MPU-401 MIDI interface, joystick connector, built-in CD-ROM interface, and more. The Advanced Signal Processing chip delivers 4:1 real-time hardware data compression while reducing CPU demands by up to 65%. Provides 100% compatibility with all Sound Blaster applications, plus DOS and Windows sound support. You also get two Labtec CS-180 speakers that attach to your PC monitor.

CD-ROM Drive. Kit comes with the same high-quality drive that we offer in our top-of-the-line 4DX2-66V system. You also get our free system CD with Microsoft Multimedia Pack™ and more!

Kit Price (with system purchase): **$395**

Sound Kit

Get just the Sound Blaster 16 ASP sound card and two Labtec CS-180 speakers. **$199**

TelePath™ Fax/Modem

Internal fax/modem, 14,400bps modem, V.32bis, with 9,600bps fax capability. Package includes software — WinFax Pro,® Crosstalk™ for Windows and Qmodem — plus a free CompuServe® trial membership. **$195**

Network Cards

Call for a selection of Ethernet cards and Token Ring adapters, installed and configured.

Microsoft Windows™ for Workgroups

Networking made easy! Share files and printers, send electronic mail, schedule group meetings with the click of your mouse — and get everything you need in one inexpensive package. Price includes an Ethernet adapter and software. Hardware and software are factory-installed. **$159**

Colorado Memory Systems™ TBU

250MB internal automatic tape backup unit copies up to 9.5MB per minute with high-speed data compression. Comes with easy-to-use DOS software, one tape and eable. **$175**

CrystalScan® 15-Inch & 17-Inch Monitors

Non-interlaced color monitor with flat, square screen, .28mm dot pitch. If your system eomes with a 14-inch monitor, you can upgrade to the 15-inch model for **$100**, or the 17-ineh for **$600**. If your system comes with a 15-inch monitor, you can upgrade to the 17-inch monitor for **$520**. (Prices good only for upgrades at the time of system purchase.)

Panasonic® KX-P2123 Color-Capable Printer

Add color to your documents with this 24-pin dot matrix printer. Includes Adobe Type Manager.® Call for price!

Texas Instruments® MicroLaser™ Plus Laser Printer

Never before has such a small, Postscript® laser printer offered so much speed and economy. The MicroLaser Plus is only 13.4" x 14.2", yet it prints 9 pages per minute at 300dpi. Call for price!

We offer many other system options and upgrades. Call today!

Service

Every Gateway 2000 system is backed by:

- 30-Day Money-Back Guarantee
- One-Year Limited Warranty
- Lifetime Toll-Free Technical Support
- On-Site Service Available to Most Locations
- Lifetime BBS Membership
- FaxBack™ Automated Fax Service

The software and peripherals listed here are sold only with the purchase of a system. For details on our complete line of extras for Gateway customers, call our special add-on components division at 800-846-2080.

Tools on Top is now included on all Gateway 2000 mini desktop, desktop and tower systems. Program includes file manager, desktop and emergency disk portions of Central Point's award-winning PC Tools for Windows.

Gateway 2000 is a corporate sponsor of

©1993 Gateway 2000, Inc. AnyKey, CrystalScan, black-and-white spot design, "G" logo and "You've got a friend in the business" slogan are registered trademarks, and Gateway 2000 and TelePath are trademarks of Gateway 2000, Inc. The Intel Inside Logo, Intel and Pentium are trademarks or registered trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies.
Prices and configurations are subject to change without notice. Prices do not include shipping.

THE TELECOMMUTING

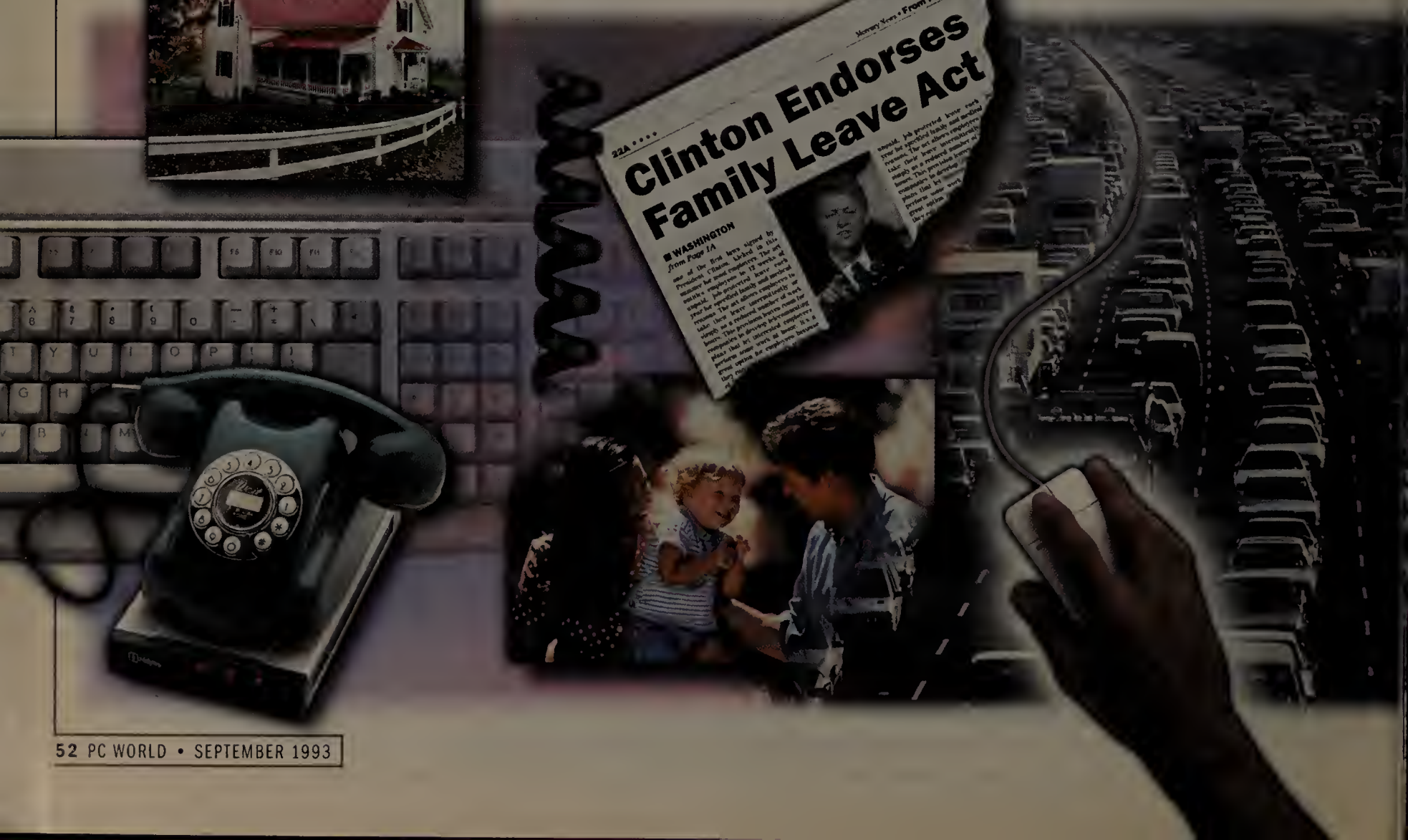
Federal and local legislation is forcing managers to determine how to implement telecommuting programs and which technologies to use. Here's what you need to consider and how to do it right.

Telecommuting isn't just a good idea, it may soon be the law. Two new acts of federal legislation make it necessary for employers to develop strategies to let staff work at home. As a result of these and other factors, the number of telecommuters is expected to increase from 4.5 million in 1993 to 7.1 million in 1996, about 5.5 percent of the work force, according to Raymond Boggs, an analyst at BIS Strategic Decisions of Norwell, Massachusetts. All these workers will rely on PCs, modems, and other telecommunications technologies to stay in touch with the main office.

The most wide-ranging legislation encouraging telecommuting is probably the Amendments to the Clean Air Act passed in 1990, which took effect last November. The amendments stipulate that employers in certain high-pollution metropolitan areas must develop plans to reduce the number of commuters. Several states, including California, have instituted their own laws to reduce commuter traffic. Telecommuting is one of the most cost-effective tools for meeting the guidelines, according to Ed Risse, a principal at Synergy Planning, a Fairfax, Virginia–based telecommuting consulting firm.

The Family and Medical Leave Act, one of the first laws signed by President Clinton, kicked in this summer for most employers. The act entitles employees to 12 weeks of unpaid, job-protected leave each year for specified family and medical reasons. The act leaves room for companies to develop telecommuting plans that let employees perform some work at home. It's a great option for employees because they can continue to earn some or all of their pay and keep their career on track.

Even if your company is not affected by this legislation, you may



Edited by Russell Glitman

IMPERATIVE

want to consider telecommuting for business reasons. These programs offer employers numerous advantages, such as increased productivity and reduced staffing and office costs. Early adopters are quick to testify to the benefits: In a two-year study involving 250 California state employees, two-thirds of the managers involved said their telecommuting employees were more effective than those who didn't telecommute, notes Jack Nilles, primary consultant on the study. Nilles just completed a similar study of 350 Los Angeles city employees that corroborated his earlier findings.

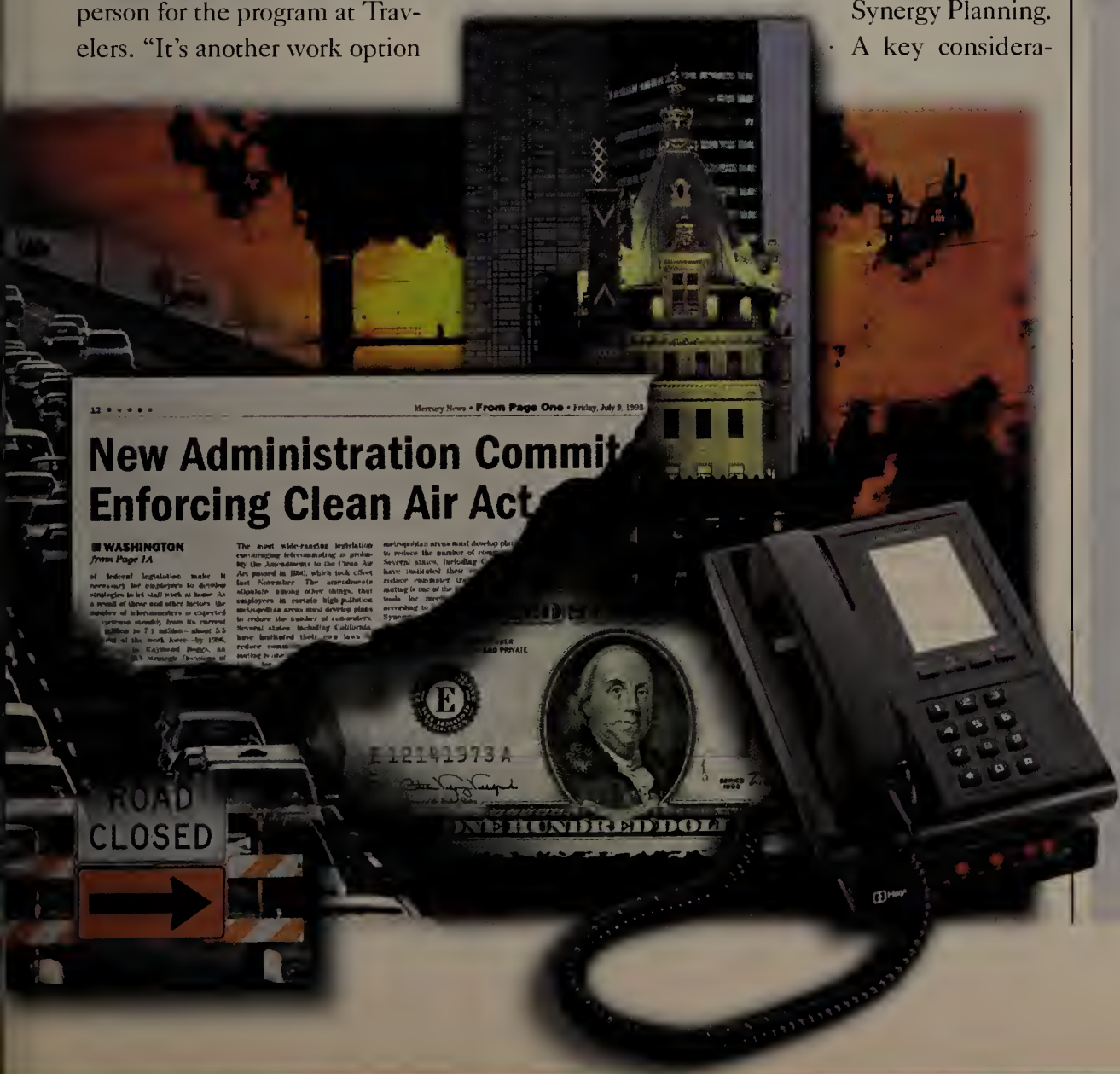
The Travelers Corporation, a Hartford, Connecticut–based financial services firm, has had a telecommuting program since 1987 and uses it to attract and retain employees. "We see telecommuting as a recruitment tool," says Jim Kalach, spokesperson for the program at Travelers. "It's another work option you can offer people." The program has also saved on retraining costs.

Choosing the Employees

Once you decide that telecommuting is right for your company, you need to select the positions and employees best suited for it. Ideal jobs include field workers who use the main office only periodically to make phone calls; creative workers, such as writers, artists, computer programmers, and managers, who need periods of undisturbed concentration; and employees whose job revolves around the phone, such as customer support staff.

After identifying the jobs, consider the individuals performing them. Choose solid workers, particularly self-starters and gregarious people who will be sure to stay in touch, says Linda Risse, another principal at Synergy Planning.

A key considera-



News Monitor

ANOTHER DOS: Novell DOS 7 will provide built-in peer-to-peer networking based on the company's NetWare Lite software. (A separate peer-to-peer LAN product, Personal NetWare, will target users of other DOS flavors.) Scheduled to ship in September, Novell DOS 7 will feature a variety of improved utilities, such as an enhanced file compression utility from Stac Electronics, which makes Stacker 3.1.

Novell DOS 7 will provide other goodies, such as preemptive multitasking that allows multiple DOS programs to run simultaneously. You'll be able to load TSRs and drivers in extended RAM, removing them almost entirely from the first 1MB of memory (rather than loading them in upper RAM with a memory manager). Novell officials also promise full-featured backup and antivirus programs from Fifth Generation Systems—unlike the scaled-down utilities in Microsoft's DOS 6.0.

MEMORY PRICE MADNESS: The price of memory chips more than doubled this summer as demand, spurred by rising PC sales, exceeded supply.

For instance, prices of 1x9 SIMMs jumped from $29 in April to $75 in mid-July, according to Ron Seide, director of marketing at Kingston Technology, a Fountain Valley, California, memory enhancement firm. Kingston is adjusting prices every couple weeks. Prices took another fast jog up in early July following a fire at a Japanese plant that makes 60 percent of the world's supply of a conductive epoxy resin used in DRAMs. Fear of a shortage, rather than any immediate

(continued on page 55)

PHOTO ILLUSTRATION: JEFF BERLIN; PHOTOS: JOHN GREENLEIGH; THE IMAGE BANK (ROSS M. HOROWITZ, G & M DAVID DE LOSSY, HMS IMAGES, PATTI MCCONVILLE, ROBERT HERKO); ILLUSTRATION: DAVID FLAHERTY

Avoiding the Pitfalls: The Five Commandments of Telecommuting

1. Set clear objectives, including work hours and measures of success.
2. Select jobs with tasks performed easily at a remote site.
3. Choose top-performing employees who are familiar with company policies and procedures.
4. Use excess or "obsolete" equipment or establish employee purchase plans.
5. Create a telecommuting contract that covers objectives, work hours, and thorny issues such as corporate liability.

Continued from page 53

tion is familiarity with the company. The Travelers Corporation allows only employees who've been with the company at least a year to telecommute.

The associated costs of having a remote office vary wildly. In the California state employee study, home office costs ranged from nothing to $4000, depending on how many days the telecommuter worked at home. If an employee worked three or more days at home, the state provided a workstation there but not in the main office, says Dave Fleming, a project manager involved in the study. The state covered expenses such as phone costs and software compatible with that in the main office.

The Travelers Corporation runs its program similarly: Full-time telecommuters receive a complete home office setup. The employees generally spend half a day at the main office delivering and picking up work and meeting with their supervisors. The main office doesn't include a work space for them. Employees who telecommute only part time generally have an office at work and receive a PC and other requisite tools for work at home. They don't usually receive furniture for their home.

Outfitting a home office for telecommuting is like outfitting any other home office, except for two major areas: security and communications. For securing data, Marty Barrack, a telecommuting technology policy analyst for the federal government, recommends a removable drive device, such as a Bernoulli Box, magneto-optical drive, or portable hard drive. Tape backup is a less popular option because the devices are slower and their data must be restored to a hard drive before it can be used. The employee should perform regular backups and keep an updated backup in the main office.

Remote-control software, such as Micro-

Gateway, AST Notes Add More Power

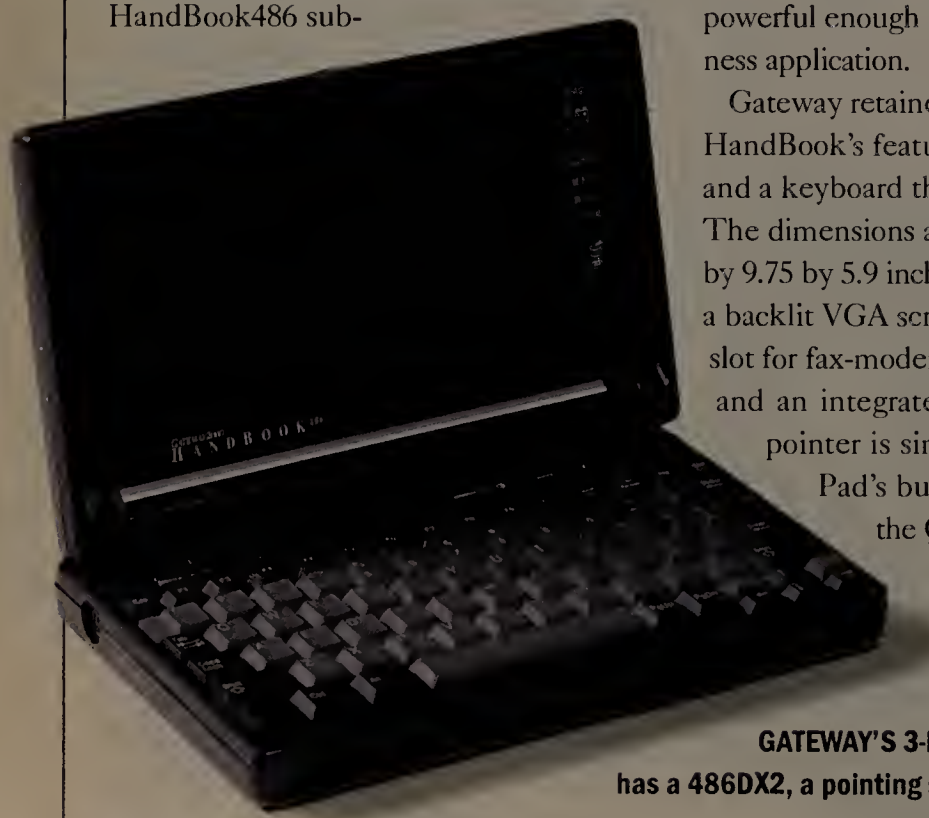
TEST DRIVE

New systems from Gateway 2000 and AST pack more computer into a smaller package.

The innovation leader in the new mobile lineup is Gateway's dramatically improved HandBook486 sub-notebook, which offers more power per pound than anything on the market. The HandBook486 comes with either an Intel 40-MHz SL-enhanced 486DX2 or a 25-MHz 486SX—energy-saving CPUs that are powerful enough to run any Windows business application.

Gateway retained the best of the original HandBook's features—its 3-pound weight and a keyboard that touch-typists can use. The dimensions are nearly unchanged: 1.6 by 9.75 by 5.9 inches. New features include a backlit VGA screen, a PCMCIA Type II slot for fax-modems and other peripherals, and an integrated pointing device. The pointer is similar to the IBM ThinkPad's but is located at the end of the QWERTY key row.

The company claims the batteries should last more than 2 hours with power management features enabled. For $1495, you get the 486SX-25 HandBook486 with 4MB of RAM and an 80MB hard drive. The DX2-40 offers a 130MB hard drive and 4MB of RAM for $1995. Both come with DOS and Windows. An optional external floppy drive is $99.



GATEWAY'S 3-POUND HANDBOOK486 has a 486DX2, a pointing stick, and a PCMCIA slot.

Three Powerful New Portables

HandBook486, ColorBook

Pricing: HandBook486 486SX-25 model $1495, 486DX2-40 model $1995; ColorBook $1995
Gateway 2000, 800/846-2000
Reader service no. 793

Bravo NB 4/25s, 4/25s Color, 4/25s ColorPlus

Pricing: 4/25s $1700, 4/25s Color $2400, 4/25s ColorPlus $3300
AST Research, 800/876-4278
Reader service no. 794

PHOTOS: JOHN GREENLEIGH; ILLUSTRATION: DAVID FLAHERTY

Additional Resources

- *Flexiplace: Questions and Answers on Computer and Telephone Issues*, publication KMP-92-1-I, by General Services Administration, single copies free, 202/501-4860, 202/501-2482 (fax)
- *The One-Minute Commuter*, by Lis Fleming, distributed by Terra Nova Press, $9.95, 916/753-1519
- *Telecommuting: How to Make It Work for You and Your Company*, by Gil Gordon, $15.95, 908/329-2266
- *Telecommuting: Moving the Work to the Workers*, by Commuter Transportation Services, Inc., $6, 213/365-6812

com's Carbon Copy and Symantec's pcAnywhere, offers an inexpensive connection for single users and small businesses with minimal information services staff. The products let employees tap into a PC at the main office and operate it as if they were there. They can retrieve and send E-mail and even access files and applications that may be too large to store on their home PC. These products are ideal for temporary telecommuting situations, such as parental leave, when the employee's office PC will remain at the main office.

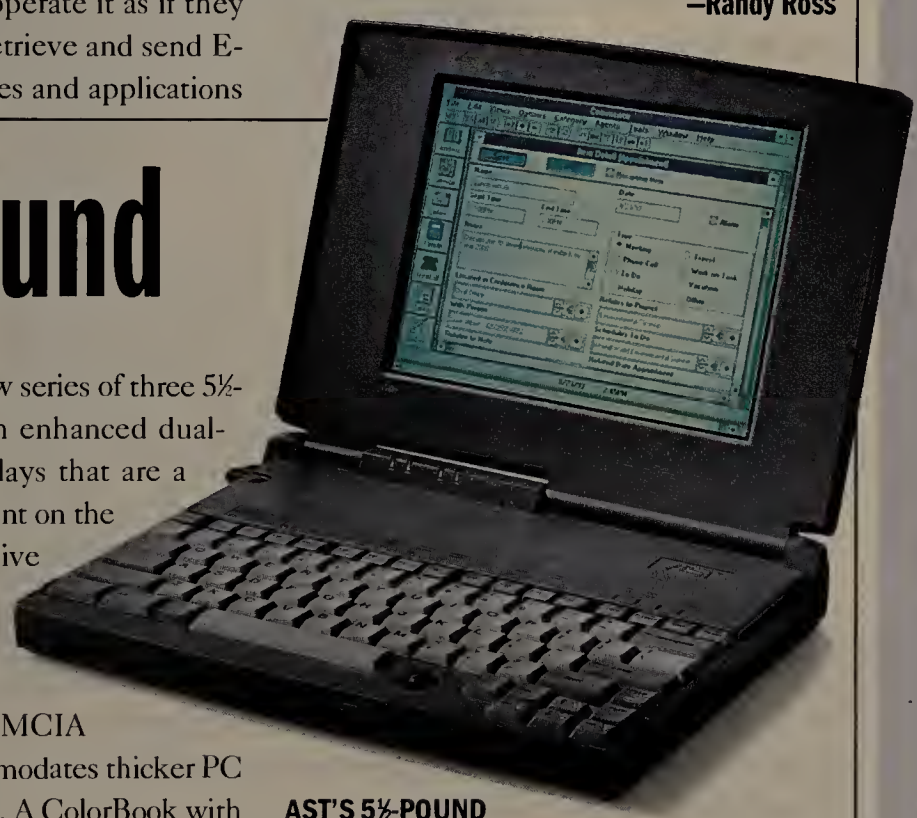
If you need a more permanent solution or need to connect multiple sites, consider other options, including multiuser remote-control products, such as Citrix's WinView for Networks, and remote networking products, like Shiva's LANRover/E and LANRover/T and DCA's Remote LAN Node. These let numerous users dial into one server simultaneously, which can reduce hardware costs.

Will telecommuting be the way most of us work in the next century? The benefits are clear: improved productivity, cleaner air, reduced office costs, and happier employees. The challenge is yours to meet.

—Randy Ross

Per Pound

Gateway also has a new series of three 5½-pound ColorBooks with enhanced dual-scan passive color displays that are a considerable improvement on the first generation of passive color displays. Other features include an integrated trackball, a floppy drive, and a PCMCIA Type III slot that accommodates thicker PC cards such as hard drives. A ColorBook with a 25-MHz 486SX processor, 4MB of RAM, and an 80MB hard drive costs $1995.



AST'S 5½-POUND BRAVO NB offers local bus graphics.

Bravo NB Notebooks

AST's new Bravo NB notebook comes with your choice of a monochrome, dual-scan passive color, or active-matrix color display. We were particularly impressed with the preproduction Bravo NB's dual-scan passive color display, which offered excellent contrast and vibrant colors. However, pricier active-matrix displays still offer better viewing angles and better contrast.

With 4MB of RAM and a 120MB hard drive, the dual-scan Bravo NB 4/25s Color costs about $2400 on the street. A similarly equipped monochrome model, the Bravo NB 4/25s, is approximately $1700; the active-matrix color model with a 170MB hard drive, the Bravo NB 4/25s ColorPlus, is over $3300. Each 5½-pound Bravo NB comes with a PCMCIA Type III slot, a floppy drive, and an integrated trackball.

—Jeff Bertolucci

News Monitor

(continued from page 53)

lack of supplies, sparked the price increases, according to Seide.

The price increases could spill over to PCs, making it harder for small vendors to compete. First-tier system vendors have chip supply contracts that insulate them from the increases. "We've seen insignificant increases and don't see any near-term impact forcing us to raise prices," says Dell Computer's Chris Efstathiou, semiconductor commodity manager. System prices are also stable at Zeos International because for now the company is absorbing the increase in memory costs, says Rick Apple, vice president of marketing.

PRINTER RIBBON DEALS A STEAL: NEC, Okidata, and Lexmark recently discovered counterfeit ribbons that deliver poor print quality, wear quickly, and can cause printhead failure, according to the three vendors.

NEC has found hundreds of thousands of counterfeit ribbons, says Joe Tamker, NEC's director of supplies, sales, and marketing. The investigation also resulted in the seizure of 12,000 counterfeit Okidata ribbons for its 100 series printers, says Chuck Kocher, Okidata's senior marketing manager for consumables and parts.

To avoid counterfeit products, examine packaging closely, stick with authorized dealers, and call NEC at 800/388-8888 for help authenticating a box, says Tamker. Users should also watch for fake ribbons for the Okidata 390 series printers, says Kocher. When you buy Okidata ribbons, make sure they're in a gray box: The fakes are in

(continued on page 57)

User Group Finds PIMs Pay Off

If you're like many of us, the day-to-day details of your job can sometimes threaten to overwhelm you. Conventional solutions, such as Post-it notes, to-do lists, Rolodexes, and leather-bound business card holders, only fuel the chaos. To the rescue comes a new generation of Windows personal information manager (PIM) programs that vendors claim will put you in control of your complex life.

Do these packages work? Yes. Should every businessperson have one? Yes. That's the unanimous vote from a group of six Boston Computer Society (BCS) volunteers—with jobs ranging from marketing consultant to CEO—who were hands-on PIM testers for two months for *PC World* this spring.

A good PIM generally includes four basic components: a contact database for addresses and phone numbers, a calendar for scheduling, a to-do list, and a notepad. Our testers looked at three PIMs: Lotus Organizer 1.0, Arabesque's Ecco Professional 1.0, and Polaris's PackRat 5.0. They used the packages at work and at home and without a lot of time to spend looking through manuals. (One tester had been using a PIM regularly.) The group didn't identify one PIM that works for everyone; instead, users learned each is best suited to a different work style. Here are their findings.

Organizer: A Quick and Easy Solution

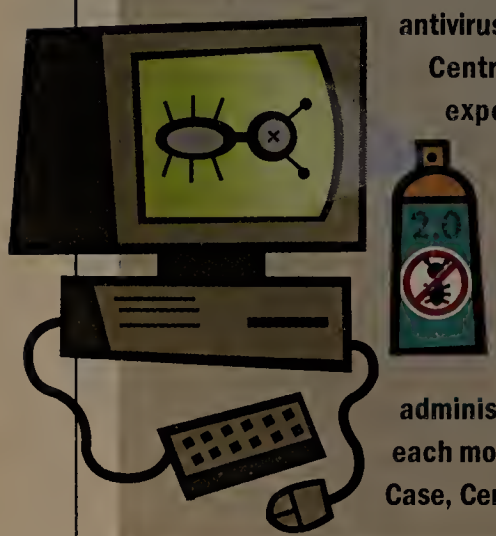
Lotus Organizer looks and works like a Day-Timer planner and rated high for ease of use with all but one tester. "If you need something simple, Lotus Organizer is it," says Jerry Blumenthal, principal engineer at Fay, Spofford & Thorndike, a Lexington, Massachusetts, engineering and planning firm. Blumenthal works at the project management level with other engineers and consultants and tracks schedules and meetings. "I really like the pull-out planner to plot and track events," he adds. "I print the appointment list every day." Organizer meets his key need: ease of use.

LOOKING FOR SIMPLICITY: Lotus Organizer fit the bill for Jerry Blumenthal, principal engineer at Fay, Spofford & Thorndike.

Henk Portier also liked Organizer best for classifying customer information for his disaster recovery and consulting business, Dr. Computer, in Needham, Massachusetts. "I like Organizer for the interface and intuitiveness," says Portier. "It's easy to import files. I want a program you don't have to open the manual for." Portier prints many

Expert-System Virus Protection:

Now that virus protection comes with the latest versions of Microsoft DOS and IBM DOS, do you need a separate antivirus package? Central Point Software thinks so and has released the latest version of its antivirus crusader. Here's what you get.



Central Point Anti-Virus 2.0 features a new expert system that uses a rules-based engine to sniff out viral code. Called Virus Analyzer, this system searches for characteristics common to all viruses rather than for specific signatures (or code) of individual invaders.

Thanks to Virus Analyzer, "system administrators don't have to upgrade 100 PCs each month with antivirus upgrades," says Tori Case, Central Point Anti-Virus product marketing manager. For those who want the assurance of being protected against the latest known viruses, Central Point will continue to offer updates every four to six weeks.

Another advantage of Central Point Anti-Virus is that it's designed for use with large networks. The antivirus utility in MS-DOS 6.0—a scaled-down version of Central Point's product—is for single-user PCs only, Case says. Central Point Anti-Virus 2.0 offers such business-friendly features as password protection, an events scheduler, and network install—ease-of-use capabilities not found in the MS-DOS utility.

In addition to scanning files in DoubleSpace, Stacker, and SuperStor compressed formats, Central Point Anti-Virus 2.0 also scans files stored in PKZip, PKLite, LZEXE, and ARJ formats.

The program's list price is $129.95; upgrades are $29.95. Central Point Software, 800/964-6896, 503/690-8088. Reader service no. 784

PHOTO: RICK FRIEDMAN; ILLUSTRATION: GORDON STUDER

to-do lists and phone lists because he also heads BCS's Consultants & Entrepreneurs special interest group. "For most of my customers, Organizer would be all they'd need," he adds. (Organizer 1.1, to be released in August, retains the same interface and features but adds compatibility with cc:Mail for group scheduling. A Notes-compatible version is slated for year's end.)

Organizer has a few cons: You can't customize fields in the address book or schedule overlapping events, Blumenthal points out. Portier found it disappointing that when he imported contact names in several DBF files, Organizer couldn't find and delete duplicate entries easily.

DROPPING HER DAY-TIMER: Louise Reilly Sacco opted for Ecco. "It makes life easier."

Ecco Adds Outlines to the Mix

Arabesque's Ecco, the rookie of the group of PIMs we tested, scored well for its interface, which shows information in a flexible outline form with folders for attaching data to items in the outline. The Shooter utility, which copies information from other Windows applications and imports it to Ecco, also won high praise.

Louise Reilly Sacco, a marketing consultant in Needham, Massachusetts, liked the Ecco and Organizer interfaces. "There are days when I get on the phone and have 40 calls to complete, half of which will tell me to call back at a certain time," Sacco says. She needs a to-do list that rolls over undone tasks. Both Organizer and Ecco offer such a feature, but Ecco has a split view with both the to-do list and calendar on the same page, which Sacco says she prefers.

Tracking information in outlines makes sense, says Andrew Novick, who owns a document imaging consulting business in Cambridge, Massachusetts. "I like that the outlines are hierarchical and I can attach data to items," Novick says. He prints Ecco outlines and uses them to detail his activities in reports for customers. "Ecco has more of a learning curve than Organizer. The screen is kind of cluttered, and sometimes there were icons I didn't recognize. But the format is better for me." Novick was so impressed, he's using the software to plan his wedding.

George Beard, CEO of computer manufacturer i Corp in Boston, says Ecco offers a solution for executives who want to organize different kinds of information. "It's a good way to store information in electronic files," he says. "I'm taking information from CompuServe and filing it in many different ways. I use Ecco for jotting notes, planning, and putting the information in folders. The Shooter makes it all the better; when I type a letter, I use Shooter to file it." Beard already uses a PIM, Okna's DeskTop Set, strictly for its phone management features. His day centers around vendor and customer calls, and he wants a PIM that identifies a caller before he picks up, a feature that DeskTop Set provides. Beard decided to keep DeskTop Set for his phone calls but to use Ecco as well.

Ecco had one con for Sacco: If you write in rambling, narrative style, getting used to outlines takes time, she says. Blumenthal

News Monitor

(continued from page 55)

white boxes. They are often labeled "Oki" rather than "Okidata."

Counterfeiting isn't a widespread problem for Lexmark, but it is conducting several investigations, says Michael Yaro, supplies product planner for Lexmark. This spring Lexmark uncovered counterfeiters who were replicating packaging, then putting generic ribbons inside. Avoid ribbons that don't have a company name on them, Yaro says.

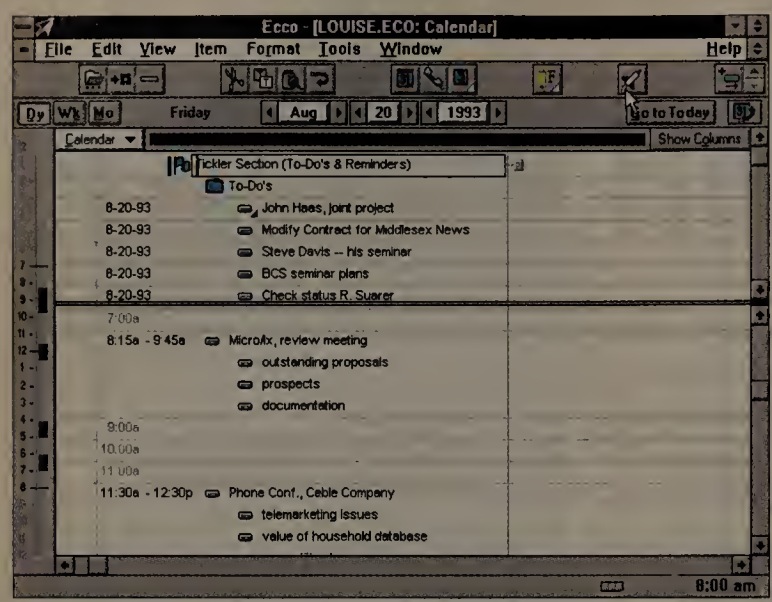
BIG BLUE DISPLAYS: IBM is entering the high-end–monitor business with four ergonomically correct, digitally controlled monitors. They include two 14-inch monitors with standard screen technology and two 15-inch flat-screen models; prices range from $499 to $599. This fall 17- and 21-inch models that work interchangeably with the Apple Macintosh will be unveiled. Pricing for those models was unavailable at press time.

The .28mm dot pitch monitors achieve reduced glare via the combination of a screen-etching process and an antiglare coating. They meet the Swedish MPR-II standard for low emissions and Sweden's tougher new TCO-91 recommendations. The monitors remember 26 settings—11 of which are user definable—for special screen configurations and have four levels of power management.

—Edited by Randy Ross

Contributors: Joe Abernathy, Jeff Bertolucci, Russell Glitman, and Laurianne McLaughlin

PHOTO: SETH RESNICK; ILLUSTRATION: DAVID FLAHERTY



ECCO SHOWS a to-do list above a daily calendar view. At top, a Rocket icon activates the Shooter feature.

Continued from page 57

says Ecco seems cluttered, but that he might grow to like it, since folders make sense for his projects.

PackRat Offers More Customization

Polaris's PackRat delivers more customization capabilities than either Lotus Organizer or Ecco. The program not only manages your information, but also organizes your desktop. You design folders that can hold your database, calendar, or even icons to launch other applications. Version 5.0's customized folder—which has setups for 12 professions, including engineer, consultant, and MIS director—seemed promising, but none of our testers found the setups significantly helpful. PackRat gives you more flexibility for adding or sorting fields and constructing unique screen views than the competing two PIMs offer.

Arnold Bilansky, a systems analyst for the Massachusetts Department of Public Health's Division of Food & Drugs, liked PackRat the best. Bilansky purchases hardware and software and trains and supports about 50 employees. He has to do a lot of scheduling and must take notes on products and requests. And as leader of BCS's Excel/Word special interest group, one of his duties is to schedule meetings and speakers.

"If someone were just looking for an easy PIM, I'd recommend Organizer," Bilansky says. "But I'd use PackRat myself because I can go to town customizing it. I can get a bigger calendar view, do different printouts, and customize my contact lists. I need to change fields in the address book entry and sort them by what I want to do." Bilansky also liked PackRat BASIC, a macro language that automates tasks and allows you to create links to other applications. He says that if you're project oriented, you should take the time to set up different folders by project and link them to the applications that you use frequently.

According to our group, PackRat's biggest con is its learning curve. Blumenthal, Sacco, and Novick lost patience with the options in PackRat, the complex manual, and some of the program's icons.

After spending almost two months with the PIMs, all six BCS testers say that personal information management software is just as important as a word processor or a spreadsheet.

"Anybody who's using a Day-Timer should be using a PIM," says consultant Sacco. "It makes life easier."

—Laurianne McLaughlin

Three Windows PIMs

WINDOWS Our users test drove these PIMs with varying results.

Ecco Professional 1.0

Pricing: $99 till September 22, $395 thereafter
Arabesque Software Inc., 800/457-4243, 206/869-9600
Reader service no. 791

Lotus Organizer 1.0

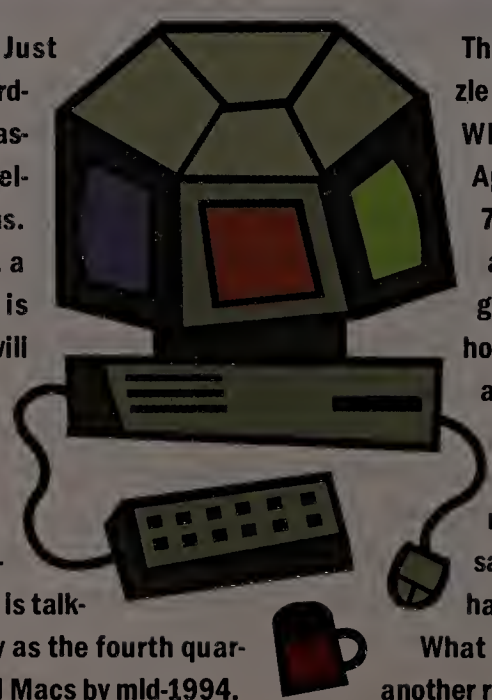
Pricing: $149
Lotus Development Corp., 800/343-5414, 617/577-8500
Reader service no. 790

PackRat 5.0

Pricing: $395
Polaris Software, 800/722-5728, 619/592-7400
Reader service no. 792

IBM's Pentium Alternative:

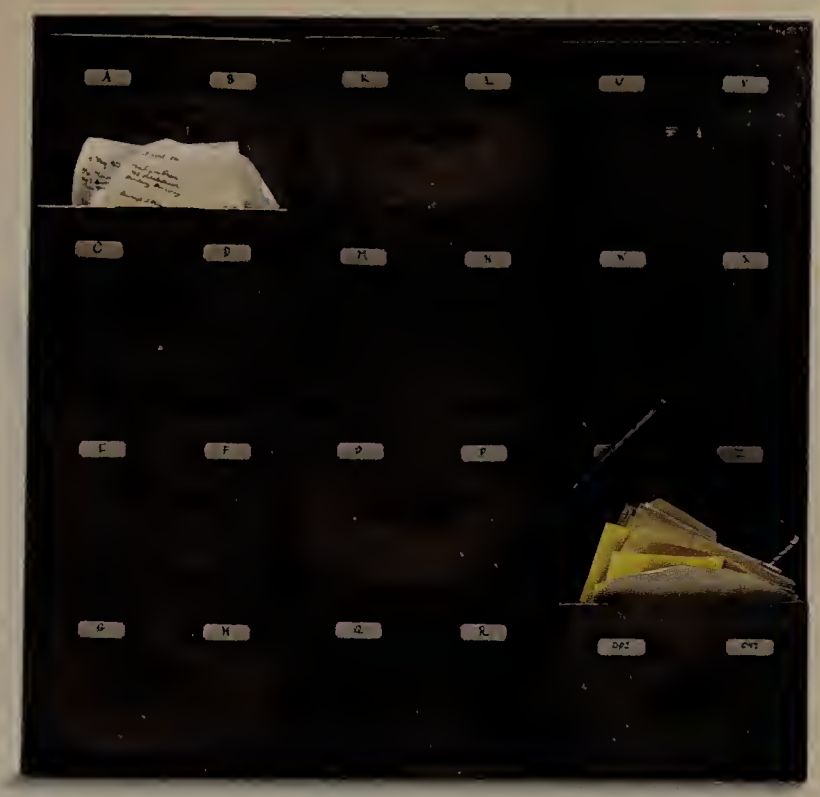
Just when you thought you had a handle on your hardware and operating system choices and purchasing plans for the next year or two, recent developments could force you to review your options. The new 32-bit PowerPC 601 microprocessor, a joint venture by Motorola, IBM, and Apple, is available in quantity to vendors, and systems will be available in the fourth quarter. This 66-MHz RISC chip costs about $450 (versus the $926 Pentium) in quantities of 1000 and runs about twice as fast. According to Linley Gwennap, analyst at the *Microprocessor Report* published in Sebastopol, California, "IBM is talking about shipping PowerPC systems as early as the fourth quarter." Apple has said it will ship PowerPC-based Macs by mid-1994.



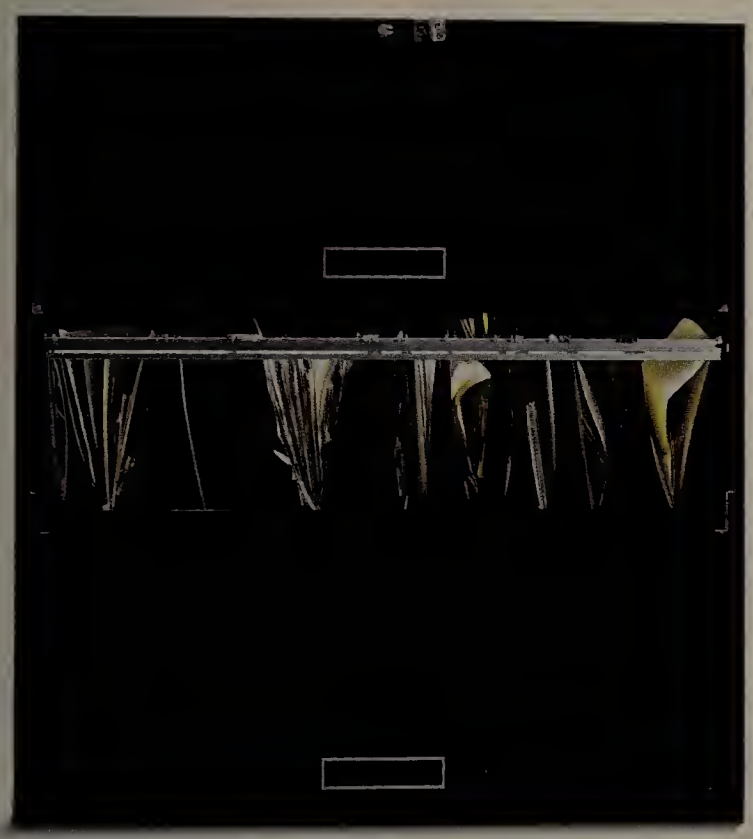
The PowerPC is only part of the high-end buying puzzle confronting managers. There have been hints that Windows NT could be ported to the PowerPC, and Apple is said to be considering licensing its System 7 operating system not only for the PowerPC but also for Intel systems. Meanwhile, MIPS Technologies' R4000 and R4400 RISC chips are finding homes in new systems. High-end DEC Alpha PCs are available now and a version for less than $3000 could appear in 1994. Both the MIPS and DEC chips offer as much as four times the performance of Intel's 66-MHz 486DX2s at about the same price. However, there are few applications that have been compiled to run on these processors. What does this augur for 486 system pricing? Look for another round of cuts by year-end.

GORDON STUDER

250 A.D. ~ Ancient Scroll Cabinet



1790 ~ Wooden Track-Drawer Cabinet



1970 ~ Aluminum Alloy Retractable Door Cabinet

INTRODUCING THE BIGGEST ADVANCEMENT IN THE HISTORY OF FILING SYSTEMS.

1993 ~ The New ScanPartner Plus By Fujitsu

In the last 1,500 years or so, document filing systems haven't changed much. Until the new ScanPartner™ Plus by Fujitsu. It gives you the ability to file more documents than all the file cabinets shown here combined.

The ScanPartner Plus is a complete entry-level document imaging solution consisting of a Fujitsu scanner and software package from such leading vendors as Compulink, Xerox Imaging Systems and Blueridge. Just add your PC, Sun workstation, Macintosh, and controller board and you're up and running.

It gives you the power to convert mountains of paper documents into electronic files you can locate instantly. It also lets you get more out of your office space by making those rows of dusty file cabinets a thing of the past. And as your needs change, Fujitsu's complete line of scanners will grow with you, far into the future.

For more information on the ScanPartner Plus, call Fujitsu at **1-800-831-4094**. Or for faxed information, dial 1-408-428-0456 from your fax machine and request document number 1224.

And since ScanPartner Plus gets you started fast at an affordable price, now is a great time to make your file cabinets history.

The ScanPartner Plus gives you the ability to electronically file documents, eliminating the need for those bulky rows of file cabinets. It's like getting free office space with each scanner you buy.

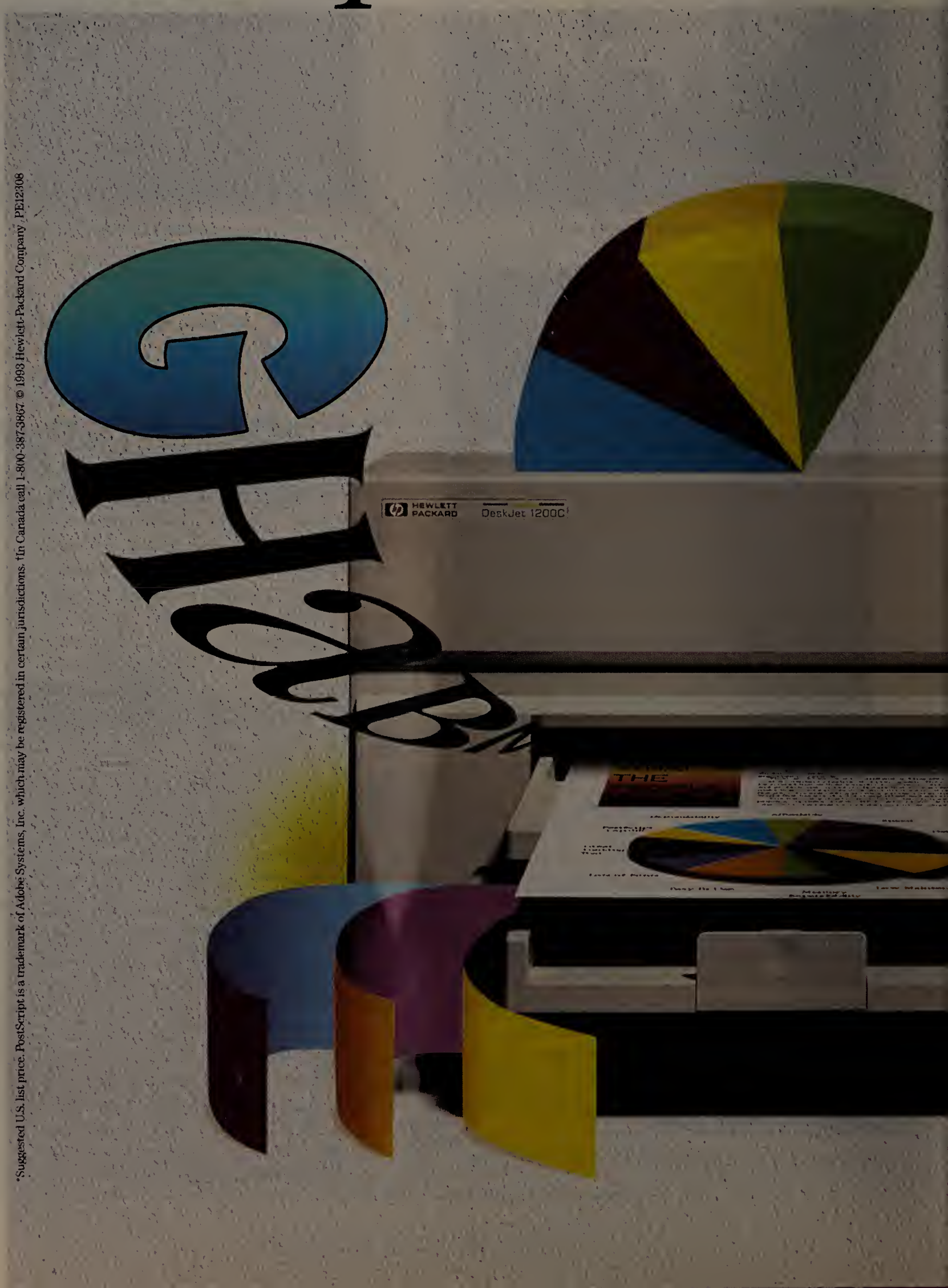
FUJITSU

COMPUTERS, COMMUNICATIONS, MICROELECTRONICS

©1993 Fujitsu. All rights reserved. ScanPartner is a trademark of Fujitsu Computer Products of America, Inc. All brand names and product names are trademarks or registered trademarks of their respective holders.

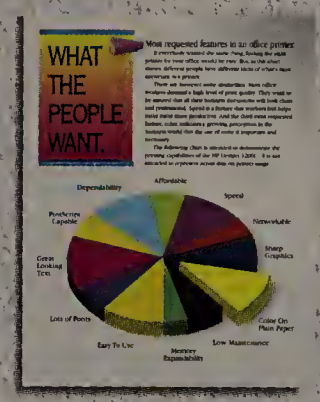
Circle 153 on reader service card

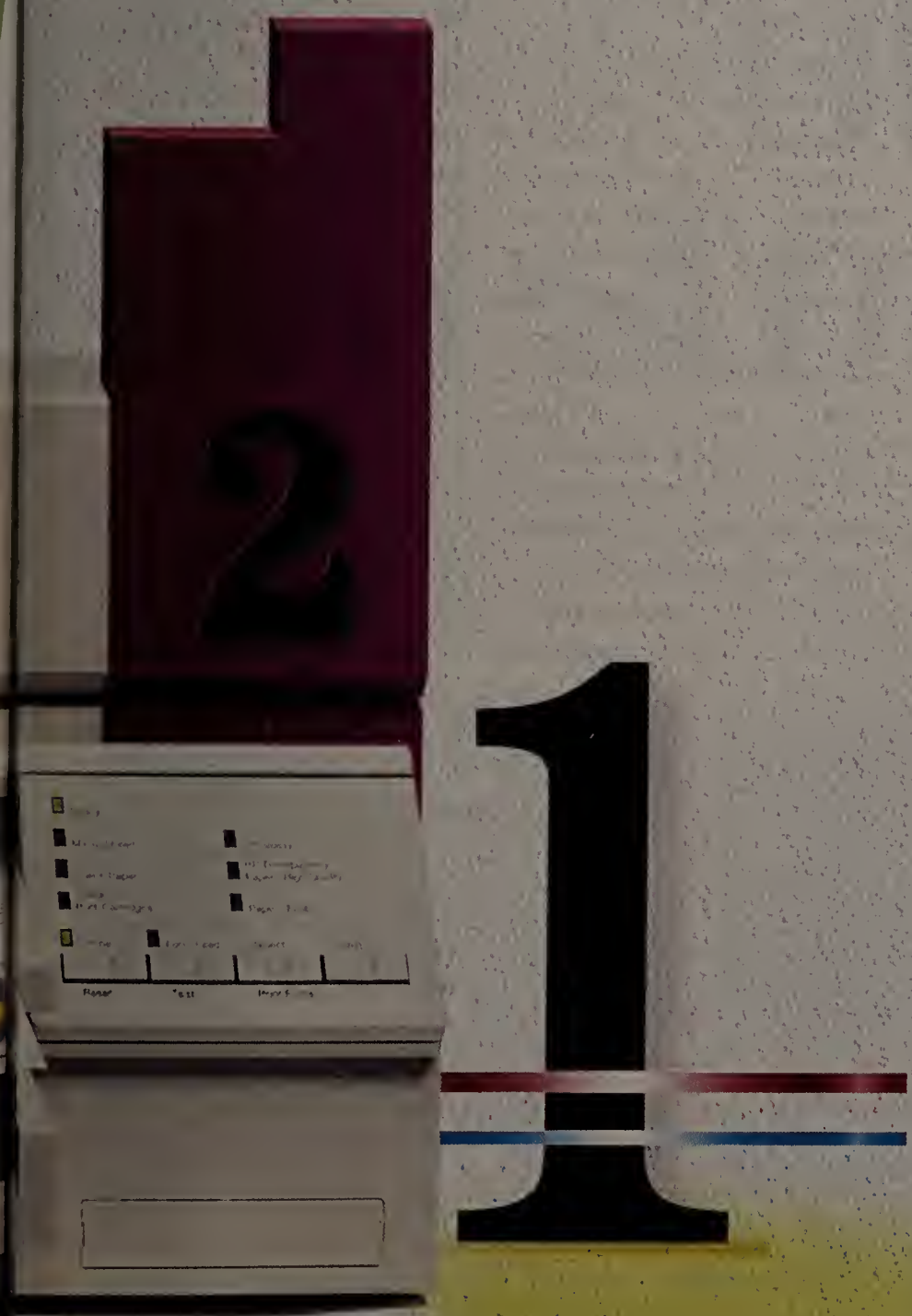
Wake up and smell



*Suggested U.S. list price. PostScript is a trademark of Adobe Systems, Inc. which may be registered in certain jurisdictions. †In Canada call 1-800-387-3867. © 1993 Hewlett-Packard Company. PE12308

the future.





The new HP DeskJet 1200C.

$1,699.*

Welcome to the dawning of a new era in office printing. Hewlett-Packard presents the HP DeskJet 1200C. The world's first affordable, networkable, plain-paper, 300-dpi black and color printer.

The HP DeskJet 1200C printer has everything your users could want. HP's next generation of inkjet technology, for sharp 600x300-dpi black and stunning 300-dpi color on plain paper. LaserJet PCL 5 compatibility, so it runs any existing LaserJet printer file or font. And network upgradability, giving everyone equal access to high-quality color.

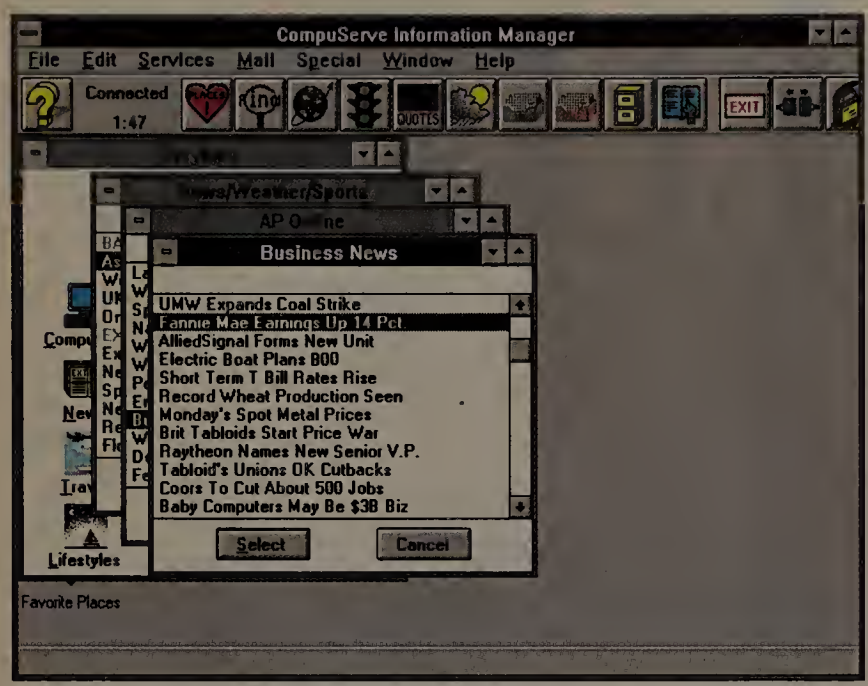
Besides offering compatibility and great print quality, the DeskJet 1200C is fast. Six pages per minute for black & white. And only one to two minutes per page for color graphics. It comes with 45 scalable fonts, same as the new HP LaserJet 4, and lets you easily add PostScript.™

The future of office printing is here. To see for yourself, call 1-800-552-8500, Ext. 7398 for the name of the HP dealer nearest you.†

DeskJet Printers
Make it happen.

HEWLETT PACKARD

Online News Services Offer Custom Information



YOU CAN BROWSE COMPUSERVE'S extensive collection of news.

TEST DRIVE While the newspaper industry wages war with the telephone and cable television industries over the future of information delivery, a growing number of innovators are "publishing" news online that you can tailor to your needs.

This new breed of electronic news delivery services and software lets you customize the format and content of news and even the way you receive news.

Electronic news agencies offer a range of services. If you want quick facts, The Daily News Alert from JRA Information Services will scan 1600 periodicals for topics you've preselected and send a synopsis or clipping via mail or fax.

If you're looking for news on screen, MCI's Information Advantage program allows you to have a number of different offerings delivered to your mailbox. Among the information providers available are Individual Inc., an "information refinery" that delivers a customized daily newspaper; Dialog; Dow Jones News/Retrieval; Dun & Bradstreet Information Services; History Associates, a historical consulting service; Information Inc., which prepares custom news reports; NewsNet, which offers the full text of more than 600 newsletters and more than 20 news wires; and The Search Bulletin, a headhunter service.

Individual Inc. also will deliver its customized news products, First and HeadsUp. First delivers news via fax, E-mail, or Lotus Notes. HeadsUp provides news synopses via fax or wireless connection to pagers and hand-held PCs using Motorola's Embarc system.

CompuServe's extensive online news system includes weather information, AP, UPI, Reuters, Press Release Newswire, Washington Post, Agence France-Presse, Deutsche Presse-Agentur, Kyodo, Xinhua, and historical news databases. The CompuServe Executive News Service scans the news for any number of chosen topics and saves the results to folders that you can review for $15 per hour. America Online, meanwhile, features the Washington Post News Service. And Prodigy has its own newsroom—the only one in the online universe—but Prodigy offers little more than headlines.

Windows users can get their news with an exciting new product called Journalist—Live Page Layout for Windows. The $129.95 application interacts with CompuServe to let you build a customized daily newspaper. Most topics, including weather maps, business news, and the full AP news report, are available for the flat-rate basic subscription, but historical stock analysis charts add extra fees (5 cents per historical quote). Journalist also works with the Executive News Service.

Extra, Extra

News in Motion offers a unique global view of the news. Each week it gathers and translates the top 50 or 60 stories in the world from international newspapers and wire services including the *Economist* and *Financial Times* in the United Kingdom, *Le Monde* and the *International Herald Tribune* in France, *Shimbun* in Japan, and others. A 10-minute weekly download at 9600 bps also delivers ten color

Online News Services and Software

Innovative ways to get the news mean you may never have to be out of touch.

The Daily News Alert
$23 per month for ten summaries on any one topic; each article thereafter $1; fax delivery $1 per summary
JRA Information Services Inc., 800/622-8900, 214/702-8903
Reader service no. 795

DowVision
$1000 a month for ten people
Dow Jones Information Services, 609/520-4677
Reader service no. 797

Executive News Service
CompuServe executive membership, plus $15-an-hour access charge at 300 bps
CompuServe, 800/848-8199
Reader service no. 798

First and HeadsUp
Pricing varies
Individual Inc., 800/766-4224, 617/354-2230
Reader service no. 799

Information Advantage
$35 a year, plus a charge for each message you send; each news service carries a subscription fee; no charge for receiving messages
MCI Int'l, 800/444-6245, 202/416-5600
Reader service no. 800

Journalist–Live Page Layout
$129.95
Ped Software Corp., 800/548-2203, 408/253-0894
Reader service no. 801

NewsEdge
Starts at $10,000 a year for five users
Desktop Data Inc., 617/890-0042
Reader service no. 802

News in Motion
$250 a year
WalkSoft, 716/271-8250
Reader service no. 803

Newsweek Interactive
$49.95 per issue
The Software Toolworks, 800/234-3088, 415/883-3000
Reader service no. 796

Tax News Network
$50 per month basic service
Coopers & Lybrand, 800/528-5816
Reader service no. 804

Introducing
PC DOS 6.1

The best utilities investment on the market.

Before you sink a penny into MS-DOS® 6, consider a better way to maximize the return on your PCs—the new PC DOS 6.1 from IBM.

It's got utilities that earn the highest rating. The automatic antivirus scan detects nearly twice as many viruses as MS-DOS, while taking up a fraction of the space (just 1K–6K, versus 7K–44K for MS-DOS).

What's more, it's got utilities you don't get with MS-DOS. Such as the full-screen Program Scheduler and the Integrated E Editor. Full Screen Backup gives you differential backup of modified files, as well as incremental, tape and NetWare® file attribute backups—and it can resume interrupted backup. Also, high-speed floppy disk support is two to three times faster.

Your memory management will pay dividends, too. The Memory Optimizer not only gives you more available memory, but also a configuration watcher to help run your system more efficiently.

And you can bank on the best service and support in the business. Including a 24-hour helpline you can actually reach, and 60 days of free support.

To order PC DOS 6.1, see your local software dealer. Or call **1 800 342-6672.** (In Canada, call **1 800 465-7999.**) When you consider all the options, PC DOS 6.1 is the only one to pick.

Features and Functions	PC DOS 6.1	MS-DOS 6
Backup—Tape support;	x	
High-speed floppy disk support	x	
Approximate number of viruses that can be detected	>1,400	800
Automated system configuration optimizer	x	
PCMCIA II support	x	
Enhanced editor	x	
Program scheduler	x	

IBM®

IBM is a registered trademark of International Business Machines Corporation. MS-DOS is a registered trademark of Microsoft Corporation. NetWare is a registered trademark of Novell Corp. © 1993 IBM Corp.

Circle 133 on reader service card

Continued from page 62

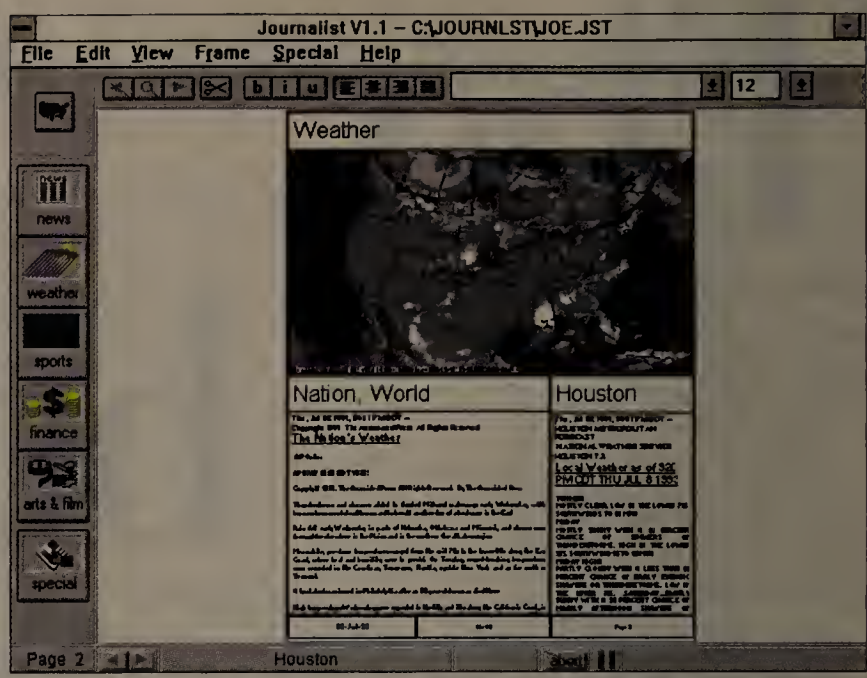
photos and four original graphics, all accessed from a Windows interface.

Newsweek Interactive is a CD ROM product published quarterly that includes recorded interviews and graphics. It costs $49.95 an issue.

Competitive Edge

Moving up the scale, the NewsEdge "intelligent" news service can put your company on the cutting edge of journalism, but it's expensive. Intended mainly for delivery on local area networks, NewsEdge aims to help people restructure the way their organization gets news, in this case selecting from among 130 services, including AP, Comtex (a sister service to UPI), Dow Jones, Federal Filings, Federal News Service, Knight-Ridder Tribune, PR Newswire, and Reuters. This real-time interactive system alerts you to events based on triggers—such as the Dow dropping 10 points—that you set. It can also create briefings of news article clips to construct a custom clippings database. Prices start at $10,000 a year for five users.

For business news, it's hard to beat DowVision, which includes the *Wall Street Journal*, Dow Jones News Services, Dow Jones International (financial news), three press release wires, the Japan Economic Newswire, Investext Abstracts, Capital Markets Report, the Professional Investor Report, and Federal Filings. The DowVision service offers customized delivery based on your search criteria, bringing the news to you via software for DOS, Windows, UNIX, Lotus Notes, NeXTstep, or the Macintosh. For $1000 a month, ten people in a business can use the service. For individuals—or senior executives—an affordable way to access DowVision is with a subscription to Tax News Network from Coopers & Lybrand, which for another $50 per month combines DowVision with breaking news about tax developments; analysis; and electronic-mail access to tax law experts.



SPECIFY THE NEWS you view with Journalist—Live Page Layout for Windows. Dozens of weather maps are available via CompuServe.

Caveat emptor: Electronic news, like printed news, varies widely in quality. UPI is available at low cost, for instance, but AP is considered more comprehensive. Remember to ask exactly what you're getting with a subscription, and from whom.

—Joe Abernathy

Stacker 3.1 Versus DoubleSpace:

With the introduction of DoubleSpace in MS-DOS 6.0, more users are aware of the benefits—and potential pitfalls—of data compression. While many have found DoubleSpace a handy tool for boosting disk capacity, others claim the compression program has crashed systems, corrupted files, and lost data.

While the verdict is still out on DoubleSpace, Stac Electronics has begun touting its Stacker data compression product as the "safe" alternative for Microsoft DOS 6.0 users. The new Stacker 3.1 ($149) has a number of features designed specifically for use with DOS 6.0 and Windows 3.1 and will even convert DoubleSpace-compressed drives to Stacker drives (see *New Products*, page 84).

Like DoubleSpace, Stacker 3.1 integrates tightly with the DOS 6.0 kernel. Both compression utilities preload their drivers and therefore don't require commands in your CONFIG.SYS or AUTOEXEC.BAT file. Also, both let you use common DOS commands such as CHKDSK, DIR, and the new DEFRAG on compressed volumes.

So how is Stacker safer? For starters, version 3.1 keeps two copies of the File Allocation Table (FAT), whereas DoubleSpace keeps only one. If a disk error causes your compressed drive to lose its only FAT in DOS 6.0, your data could be irretrievably lost. Also, Stacker scans your disk and maps out bad sectors before installation; DoubleSpace doesn't.

Another DoubleSpace shortcoming: It lacks a simple command for decompressing drives; Stacker 3.1 has an UNSTACK command. Stackometer gauges provide Windows users with a monitor of disk capacity, compression ratio, and fragmentation levels.

Stacker 3.1 also works with IBM DOS 6.1 but doesn't integrate as tightly with that as it does with MS-DOS 6.0, says Anne Galdos, Stacker product manager. But the situation should change this fall when IBM introduces an updated DOS with hooks for third-party compression products.

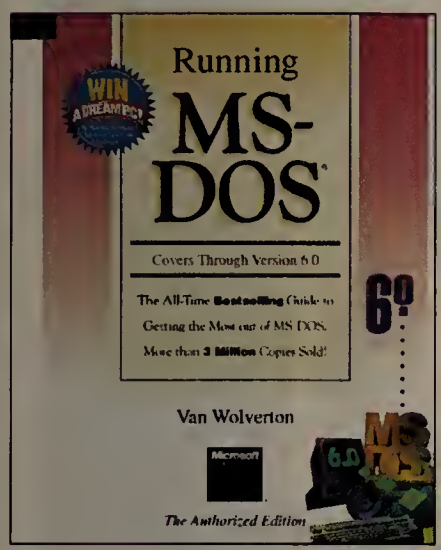
Meanwhile, Stac's patent infringement suit against Microsoft is scheduled for a December hearing in U.S. District Court in Los Angeles. Stac claims that some of the compression techniques DoubleSpace uses infringe on the company's patents. Stay tuned. Stac Electronics, 800/522-7822, 619/431-7474. Reader service no. 663

How Stacker 3.1 Works With DOS 6.0

- Tight integration with the operating system—no need for Stacker commands in CONFIG.SYS or AUTOEXEC.BAT file
- Lets you use common DOS commands (CHKDSK, DIR, DEFRAG, and so on) on Stacker-compressed volumes
- Converts DoubleSpace-compressed drives to Stacker format

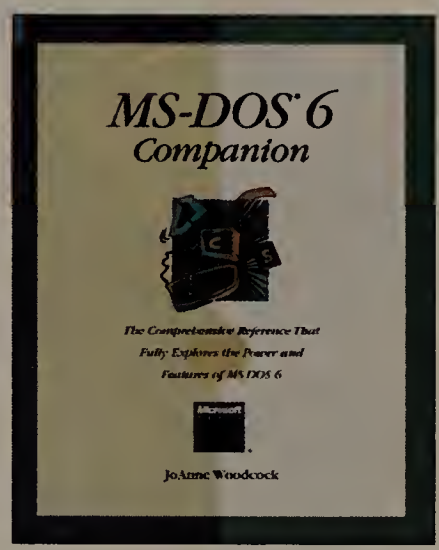
JEFF BERLIN

Six Bucks Back on MS-DOS® 6 Books



Running MS-DOS®
by Van Wolverton
The All-Time Bestselling Guide to MS-DOS—More Than 3 Million Copies Sold!
"Written by a human being for human beings, in a strange and wonderful tongue: English."
PC Week

Van Wolverton gently teaches beginners the basics and offers more experienced computer users a solid grounding in computer fundamentals. Includes coverage of MS-DOS back to version 3.3 and a complete command reference.
Suggested retail price $24.95.

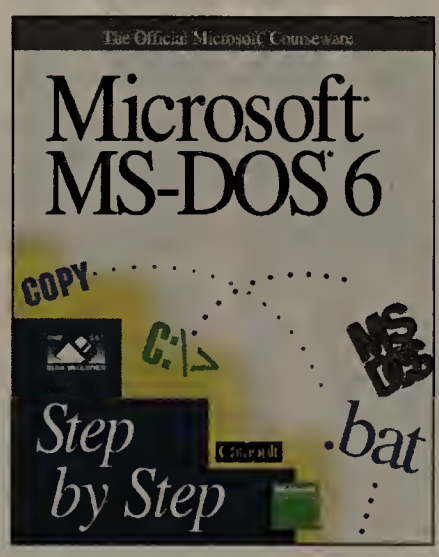


MS-DOS® 6 Companion
by JoAnne Woodcock
The Comprehensive Reference That Fully Explores the Power and Features of MS-DOS 6.

The first easy-to-understand look under the hood at MS-DOS 6. A powerful tool for support professionals who provide assistance to coworkers and business associates. It's the ultimate nonprogrammer power user's guide!
Suggested retail price $29.95.

MS-DOS® to the Max
by Dan Gookin
Tools and Techniques That Will Make Your Hard Disk Scream!
Disk Included

Easy-to-use strategies, tricks, and shortcuts from the #1-rated MS-DOS authority. Boost performance, safeguard your data, and create the ultimate MS-DOS-based system! More than 20 powerful batch files and utilities.
Suggested retail price $29.95.



Microsoft® MS-DOS® 6 Step by Step
by Catapult, Inc.
The Fastest Way to Learn MS-DOS.
Disk Included

Too busy to attend classroom training? Train yourself with this timesaving, self-paced book-and-disk package. There's no downtime because you learn right at your own desk!
Suggested Retail Price $29.95.

Purchase a Microsoft Press MS-DOS 6 book at your local retailer, mail in the official rebate coupon, and we'll send you six bucks. Buy all four and save even more! Look for the *Six Bucks Back* display!

The Official *Six Bucks Back* Rebate Coupon

To receive your $6.00 rebate, send this coupon along with your original store identified sales receipt to the address below. The receipt must show purchase date between August 1, 1993, and October 31, 1993, and have the price of each book circled.

☐ *Running MS-DOS* ☐ *MS-DOS 6 Companion* ☐ *MS-DOS to the Max* ☐ *MS-DOS 6 Step by Step*

Name

Address

City State ZIP

Send to: **Microsoft Press Rebate**
Interactive Marketing Services, P.O. Box 1156, Ridgely, MD 21681

Please allow 6–8 weeks for delivery. Offer available in the U.S. only. Offer void where prohibited, taxed, or otherwise restricted by law. Limit one rebate per book. Original coupon only, photocopies not accepted. Coupons must be received by November 30, 1993.

Microsoft Press

One Microsoft Way, Redmond, WA 98052-6399.
In Canada, call Macmillan Canada. 416-293-8141.

Microsoft and MS-DOS are registered trademarks of Microsoft Corporation.

Run Your Business Without a CPA

TEST DRIVE ▶ A new breed of Windows-based accounting programs for nonaccountants takes much of the pain out of minding your business. These packages aren't meant to replace a good accountant, but they will admirably replace a pen-and-paper accounting system or one based on less sophisticated software.

Microsoft Profit 1.0a ($199) has a unique focus on delivering analytical information on the performance of your business. You enter information regarding sales, customers, and expenditures, and Profit does the accounting behind the scenes, maintaining full journals and ledgers for examination by your accountant and lawyer. When you want to gauge cash flow or the profitability of a product or salesperson, a custom graph is just a couple of clicks away.

DACEASY INSTANT ACCOUNTING 2.0 features graphical button bars, making it the easiest to navigate of the new accounting packages.

Executive Approach

An approach less concerned with the executive and more concerned with the enterprise is taken by Peachtree Accounting for Windows 2.0 ($169). Peachtree comes network ready and offers a suite of accounting modules, including payroll (which Profit lacks). No accounting experience is required on the part of the employees who will enter sales and customer information, but traditional accounting features are easily accessed. Features such as data integrity verification and a custom forms designer—with Object Linking and Embedding, so you can use your logos—reinforce Peachtree's focus on usability at every level of your company.

While Profit and Peachtree battle for the full-featured–products market, BestBooks 1.1.1 and DacEasy Instant Accounting 2.0 let you start small and then go corporate once your widget hits it big. BestBooks by Teleware ($99) has the same interface as its big brother, M.Y.O.B., and is file compatible. Its 30-plus starter setups include some targeted at creative professionals who don't deal in inventory, although these setups seemed like a poor retrofit. The BestBooks screen is based on a simple flow chart system that makes navigating the program easy—and which helped M.Y.O.B. 3.0 win a *PC World* Best Buy in October 1992.

DacEasy Instant Accounting 2.0 ($49.95) offers the happy combination of a low price and strong functionality and design. Although all the accounting products we evaluated were fairly simple to navigate, DacEasy's intuitive icon bar made it the easiest to use—we didn't spend any time wandering around flow charts, filing cabinets, or drop-down menus trying to find out how to write a check or record a sale. DacEasy Instant Accounting is file compatible with DacEasy Accounting for DOS.

Which, if any, of these products is for you? As a creative professional, I've been looking for the right accounting package—one that will track sales of software I've written; keep up with freelance article assignments, deadlines, payments, and taxes; track expenses and assignments for my staff job at *PC World;* and keep clear tax information for my home office. That package doesn't exist. But with these applications, accounting software has improved dramatically enough that I'm now willing to use it—under the direction of a CPA.

Before you select one of these packages, determine whether you need sophisticated inventory tracking. If so, you need Profit or Peachtree. Profit's graphical analysis makes it a good choice for the executive. Peachtree is the best bet for any business in which more than a couple of people do the bookkeeping, including order entry.

If you don't need sophisticated inventory tracking, both DacEasy Instant Accounting and BestBooks are fine choices, and both offer a path to more full-featured products. I prefer DacEasy to BestBooks because DacEasy has a smoother graphical interface and it's half the price of BestBooks.

—Joe Abernathy

Easy Windows Accounting

WINDOWS **A new breed of Windows accounting programs lets you mind your business better without being a CPA.**

BestBooks 1.1.1

Pricing: $99
Teleware Inc., 800/322-6962, 201/586-3200
Reader service no. 788

DacEasy Instant Accounting 2.0

Pricing: $49.95
DacEasy Inc., 800/222-8778, 214/248-0305
Reader service no. 789

Microsoft Profit 1.0a

Pricing: $199
Microsoft Corp., 800/426-9400, 206/882-8080
Reader service no. 786

Peachtree Accounting for Windows 2.0

Pricing: $169, upgrade $79
Peachtree Software Inc., 800/228-0068, 404/564-5700
Reader service no. 787

Today's PC buyers are pretty demanding.

But that's OK...

NCR
An AT&T Company

We're up for it!

"You don't have to sacrifice performance and reliability for price."

All NCR i486™-based Windows™ workhorses are designed, built and tested by us to run today's power-hungry applications with ease. **After all, who wants fledgling performance, no matter how great the price?** Our PCs are built under the most exacting standards. NCR uses the highest-quality components from the best manufacturers, such as Conner, Quantum, Western Digital, and, of course, Intel.

And, you can rest assured that every PC is fully tested before it's delivered to you. This guarantees you optimum performance and reliability right out of the box ... at a price you'll feel good about.

"Forward-thinking technology that won't box you into a corner."

As technology changes, we'll make sure you can keep up. These NCR PCs feature:

- built-in **VESA Local Bus Video** to let you breeze through Windows applications
- a **real migration path,** so you'll be ready for new upgrades such as Intel OverDrive™ and future Pentium™ OverDrive microprocessors
- **complete compatibility** — we're dedicated to building open systems ... systems that work with your networks and peripherals
- available **on-site consulting and upgrade assistance** by our NCR Systems Engineers
- **ZIF (Zero Insertion Force) socket and Flash BIOS** for easy processor and BIOS upgrades

"Here's what makes NCR support superior."

In this business, you're only as good as your support. That's why **our own 5,000+ factory-trained Service Specialists** are located in over 700 locations throughout the U.S. We know that when you need service, you need it now. And, NCR on-site Field Engineers can service most brands and models – not just our own.

ON-SITE SERVICE BY 5,000+ NCR SERVICE SPECIALISTS

Day or night, we're there to help you with our **24-hour, toll-free Techline** which is staffed by some of the best-trained and helpful folks in the industry.

24 HR PHONE SUPPORT

It's absolutely free for as long as you own your NCR system.

Our goal is to resolve 100% of your questions the first time you call.

"You're covered with an industry-leading warranty."

3 YR ON-SITE WARRANTY

We take customer satisfaction personally.

So, you get a **30-day, no-questions-asked, money-back guarantee.** You also get a three-year, on-site, industry-leading warranty that includes the monitor!* That's right, three years of next-business-day, on-site protection.

"Help in selecting what's right for you."

It's easy to find a computer company that's willing to sell you something. But how about one that cares about what you really need? **Together, we'll figure out what kind of system you need and why.**

In the end, you'll get a PC customized for you at an off-the-shelf price. And, the **buying experience will be a satisfying one.**

** 3-year on-site warranty available in U.S. only.*

Windows On A Budget.

NCR 486SX/25

$ 1,395

or $ 50.00/ month

- ***Intel Pentium OverDrive Ready***
- Intel486SX/25 (upgradable to 50MHz)
- 120MB 17ms Hard Drive (max. 1GB)
- 4MB RAM (70ns)
- 8KB Cache (max. Write-back 256KB)
- 3.5" Flex Drive
- 14" SVGA VESA Flicker-Free Econo-Monitor
- VESA Local Bus Video
- Windows TurboCharger w/1MB VRAM
- Pre-loaded Productivity Pak & 101-Keyboard
- 3-year on-site warranty
- 3 slots/3 bays

NCR 486DX/33

$ 1,745

or $ 1,995 (w/240MB HD & 8MB RAM)

- ***Intel Pentium OverDrive Ready***
- Intel486DX/33 (upgradable to 66MHz)
- 160MB 17ms Hard Drive (max. 1GB)
- 4MB RAM (70ns)
- 8KB Cache (max. Write-back 256KB)
- 3.5" Flex Drive
- 14" SVGA VESA Flicker-Free Econo-Monitor
- VESA Local Bus Video
- Windows TurboCharger w/1MB VRAM
- Pre-loaded Productivity Pak & 101-Keyboard
- 3-year on-site warranty
- 3 slots/3 bays

NCR 486DX2/[illegible]

$ 2,25[illegible]

or $ 81.00/ month

- ***Intel Pentium OverDrive Ready***
- Intel486DX2/50
- 240MB 17ms Hard Drive (max. 1GB)
- 8MB RAM (70ns)
- 8KB Cache (max. Write-back 256KB)
- 3.5" Flex Drive
- 14" SVGA VESA Flicker-Free Monitor
- VESA Local Bus Video
- Windows TurboCharger w/ 1MB VRAM
- Pre-loaded Productivity Pak & 101-Keyboard
- 3-year on-site warranty
- 3 slots/3 bays

This PC is GREAT for your front office.

PCs For Power-Hungry Applications.

NCR 486DX2/66

$ 2,495

or $ 90.00/ month

- ***Intel Pentium OverDrive Ready***
- Intel486DX2/66
- 240MB 17ms Hard Drive (max. 1GB)
- 8MB RAM (70ns)
- 64KB Write-back Cache
- 3.5" Flex Drive
- 14" SVGA VESA Flicker-Free Monitor
- VESA Local Bus Video
- Windows TurboCharger w/1MB VRAM
- Pre-loaded Productivity Pak & 101-Keyboard
- 3-year on-site warranty
- 3 slots/3 bays

NCR 486DX2/66

$ 3,155

or $ 107.00/ month

- ***Intel Pentium OverDrive Ready***
- Intel486DX2/66
- 340MB 13ms Hard Drive (max. 2GB)
- 16MB RAM/256KB Write-back Cache
- 3.5" Flex Drive
- 14" SVGA VESA Flicker-Free Monitor
- VESA Local Bus Video
- Windows TurboCharger w/1MB VRAM
- Pre-loaded Productivity Pak & 101-Keyboard
- 3-year on-site warranty
- 6 slots/5 bays

Terrific for High Intensity Graphics!

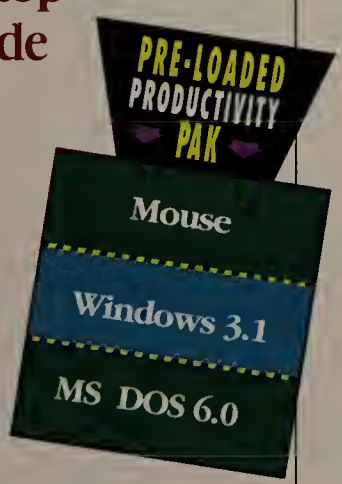
NCR 486DX2/66

$ 3,965

or $ 134.00/ month

- ***Intel Pentium OverDrive Ready***
- Intel486DX2/66 Tower Case
- 520MB 10ms Hard Drive (max. 2GB)
- 16MB RAM (70ns)
- 256KB Write-back Cache
- 3.5" Flex Drive
- 600MB CD ROM
- SCSI-2 Adapter
- 14" VESA SVGA Flicker-Free Econo-Monitor
- Super VGA Graphics Adapter
- Pre-loaded Productivity Pak & 101-Keyboard
- 3-year on-site warranty
- 6 slots/5 bays

All NCR Desktop Systems include a pre-loaded Productivity Pak:



Options: fax/modem and networking cards, memory/ disk upgrades, printers, and a variety of popular applications … call us.

Demand the best, only with NCR:

- Real configurations for real applications.
- Maximum configurability – you make the choice.
- Free 3-year on-site warranty – monitor included.
- Next-business-day service.
- Industry standard VESA Local Bus.

AT&T | NCR An AT&T Company

Call NCR Direct Connect: 800 627-8317

Stay connected on the road.

NCR's Road-Ready Systems are part of our Mobile Networked Computing strategy that combines NCR's innovative portable technology with AT&T's global communications skills. Our notebooks are smaller, lighter, faster and better-connected than ever before with available features to elevate you to a new level of mobile networking.

Road-Ready Systems

3150 Color Notebook

$ 3,755
or
$ 127.00/ month

- Intel486SX/25 (487 upgradable)
- 170MB Removable Hard Drive/Internal Flex Drive
- TFT Active Color Screen (9.5" diag.)
- Local Bus Video
- Simultaneous LCD/CRT display
- 4MB RAM/512KB Video Memory
- 1 PCMCIA slot (Type 2)
- 6.3 lb. Compact Unit/Featherweight 8 oz. AC adapter
- 3-4 Hour battery-life (NiMH)
- Snap-on cableless TrackBall
- Enhanced pre-loaded software: DOS 6.0, Windows 3.1, Bitfax, TourGuide, AT&T Mail, AccessPLUS and on-line Windows documentation
- 3-year Warranty (first year on-site)

3150 Mono Notebook

$ 2,195
or
$ 79.00/ month

- Intel486SX/25 (487 upgradable)
- 170MB Removable Hard Drive/Internal Flex Drive
- Mono Screen (9.5" diag.)
- Local Bus Video
- Simultaneous LCD/CRT display
- 4MB RAM/512KB Video Memory
- 1 PCMCIA slot (Type 2)
- 5.5 lb. Compact Unit/Featherweight 8 oz. AC adapter
- 3-4 Hour battery-life (NiCAD)
- Snap-on cableless TrackBall
- Enhanced pre-loaded software: DOS 6.0, Windows 3.1, Bitfax, TourGuide, AT&T Mail, AccessPLUS and on-line Windows documentation
- 3-year Warranty (first year on-site)

NCR is completely dedicated to satisfying the needs of demanding buyers — people like you. From the best products to the best service to the industry's most experienced and knowledgeable support staff. And, at NCR you'll never talk to an order-taker — our Sales Consultants are the absolute best in the business. Buy from NCR Direct Connect with complete confidence.

"Because you wouldn't settle for anything less."

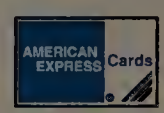
How to Order:

Just call an NCR Sales Consultant today with your Visa, MasterCard or American Express card. Corporate Purchase Orders also accepted. We also offer creative financing and lease options, available through AT&T Capital Corporation. Call for details.

800 627-8317

Call NCR Direct Connect to get the latest configurations and pricing.

Hours: 8 AM to 8 PM EST, Monday through Friday.



NCR: Performance, Price, Service and Support. We're ready for the challenge.

NCR
An AT&T Company

Prices may be lower, call for latest configurations and prices.

Call NCR Direct Connect: 800 627-8317

NCR is the name and mark of NCR Corporation. AT&T and the AT&T globe design are registered service marks and trademarks of American Telephone and Telegraph Company. The Intel Inside Logo, Intel486 and Pentium are trademarks of the Intel Corporation. DOS and Windows are trademarks of Microsoft Corporation. All other trademarks acknowledged. Prices and money-back guarantee do not include shipping. Shipping charges are calculated according to weight and distance. Appropriate sales tax will be added. NCR Corporation is not responsible for errors in typography or photography. ©1993 NCR Corporation.

MIPS-Based PCs for NT: Fast, Inexpensive, Available Alternatives

The hoopla surrounding Windows NT's introduction has subsided. You're meditating on your computing needs. Your breathing is slow and deep. Gradually, the mind clears and truth reveals itself: You're a power hound who must have NT and a blazingly fast PC! Read on.

The fastest PCs readily available to run Windows NT are based on MIPS Technologies' R4000 family of RISC processors. The low-end 100-MHz R4000PC chip is expected to offer Pentium-like performance at 486 prices. True speed freaks may opt for systems with the faster 150-MHz R4400PC processor. Like Intel's DX2s, the R4000PC and R4400PC are dual-speed chips.

Systems based on the MIPS R4000 include the $3995 Tangent Carrera 4 Workstation, the $3695 AcerFormula 4000 ($4049 with monitor), and the $3995 DeskStation Evolution rPC401e/100. Systems based on the faster R4400PC chip will likely cost $5000 to $10,000.

Unless you're running NT applications compiled for these chips, you'll have to run them in NT's Windows emulation mode. Because it's an emulation mode, you won't notice any performance boost over your 486 system. MIPS versions of technical and high-end design applications should be available when NT ships, according to Dean McCarron, senior analyst at MicroDesign Resources. However, more mainstream applications, such as spreadsheets and desktop publishing programs, may not be available in MIPS versions until late this year or early next year.

Now the good news: To accommodate the MIPS 64-bit processors, vendors added proprietary 64-bit local buses from the CPU to key components such as RAM, secondary cache, and video. PC-type features include 32-bit bus I/O and EISA or ISA slots for PC peripherals.

Carrera 4 Workstation

Tangent's Carrera 4 is powered by a 100-MHz R4000PC processor and features a 50-MHz, 64-bit local bus for memory. The system has a separate local bus for video driven by a 32-bit S3 graphics accelerator chip that displays 256 colors at up to 1280 by 1024 resolution.

PENTIUM PERFORMANCE AT 486 PRICES IS YOURS with the AcerFormula 4000 and Windows NT applications.

The Carrera 4 features a third local bus (50 MHz, 32 bit) for the SCSI and ethernet adapters and the parallel and serial ports. The SCSI port handles both a 230MB hard drive and a CD-ROM drive. Two free 16-bit ISA slots are included. The Carrera 4 comes with a 14-inch, noninterlaced monitor and a 3½-inch floppy drive.

AcerFormula 4000

Acer's AcerFormula 4000 offers a configuration similar to the Tangent's. The key differences are that the Acer includes a 128K RAM cache, a 340MB SCSI hard drive, Windows NT preinstalled, and a lower-resolution S3 video accelerator.

Evolution rPC401e/100

Deskstation Technology took a different approach with its rPC401e/100: It added a MIPS R4000PC processor to a 486 EISA system board. The rPC401e/100 features a 50-MHz, 32-bit path to memory, which will move data as fast as the 25-MHz, 64-bit local buses on the other systems, McCarron says. However, peripherals such as video boards and hard drives will use the slower 8.33-MHz, 32-bit EISA bus. To counter this, the system includes a 50-MHz, 64-bit path for its 512K secondary cache, which allows faster access to frequently used data and instructions.

The vendor claims the rPC401e/100 will perform on par with competing systems for all but the most graphics-intensive applications, such as imaging. The system includes a 200MB hard drive, a 3½-inch floppy drive, three free EISA slots, and a 14-inch, noninterlaced color monitor. Now if only it had a more appealing name.

—Randy Ross

Tangent Carrera 4 Workstation, Acer AcerFormula 4000, Deskstation rPC401e/100

Workstation performance and PC compatibility for power users who want to run Windows NT now.

Tangent Computer
800/800-6060, 415/342-9388
List price: $3995
Reader service no. 646

Acer America
800/733-2237, 408/432-6200
List price: $3695 without monitor, $4049 with monitor
Reader service no. 647

Deskstation Technology
800/793-3375, 913/599-1900
List price: $3995
Reader service no. 648

Mitsubishi's Latest Diamonds Cut Glare, Improve Brightness

MITSUBISHI'S DIAMOND SCAN MONITORS use flat-square CRTs, which are curved side to side, to maintain image sharpness and reduce on-screen glare.

Following the leads of Nanao and NEC, who have lately discovered there's money to be made moving leading-edge monitor technology into the mainstream market, Mitsubishi has introduced its new FS line of flat-square monitors. The Diamond Scan 15FS, Diamond Scan 17FS, and Diamond Pro 21FS inherit many of the best features of the company's previous displays but cost substantially less.

The three new monitors use flat-square CRTs—flat from top to bottom, curved from side to side—which help maintain image sharpness and reduce on-screen glare because they don't reflect overhead lights. All three also use what's known as an Invar shadow-mask, which helps produce brighter images.

You can store sizing and positioning information for 20 screen resolutions, which eliminates the need to resize or reposition the screen image manually when you switch, say from Windows at 800 by 600 to DOS in standard VGA.

The 17- and 21-inch monitors employ a technology called Dynamic Beam Forming, which helps maintain focus as electron beams travel from one corner of the display to another. All the screens have high-contrast, antiglare coating. All three monitors comply with the MPR II standard for electromagnetic field emissions.

The 15FS, which displays resolutions up to 1024 by 768 at a quick 76-Hz noninterlaced refresh rate, lists for $645 (versus $635 for NEC's comparable 3FGe). The 17FS displays up to 1280 by 1024 at 74 Hz noninterlaced and lists for $1299 (NEC's 5FGe lists for $1155); it should be available for under $1000 on the street. The 21FS displays up to 1600 by 1280 at 60 Hz and 1280 by 1024 at 76 Hz; it lists for $2999.

—Dan Miller

Mitsubishi FS monitors

A new line of flat-square monitors that combine high-end features with mainstream prices.

Mitsubishi Electronics
800/843-2515,
714/220-2500
List price: Diamond Scan 15FS $645, Diamond Scan 17FS $1299, Diamond Pro 21FS $2999
Reader service no. 649

Appian's Renegades Promise Faster Graphics Action

The good news: A graphics accelerator for your PC has never been more affordable. The bad news: It's almost impossible to keep all the new models and vendors straight. In the past year, dozens of accelerator boards have appeared on the market, many of them based on graphics chips from IIT, ATI, and Weitek. Now Appian Technology is jumping into the accelerator fray with a line of Windows accelerator boards built around its own graphics chip.

Appian has introduced two lines of accelerators, the high-end Renegade 1280 and the more affordable Renegade 1024. Both the 1280 and the 1024 come in ISA and VL bus versions, while the 1280 includes an EISA version. All Renegade boards are based on Appian's 98032 graphics processor, which uses acceleration techniques to deliver speedy graphics performance for Windows and CAD applications.

The Renegade 1280 supports a maximum resolution of 1280 by 1024, displaying 256 colors at a flicker-free 75-Hz refresh rate. All versions of the Renegade 1280 display up to 16.8 million colors at VGA (640 by 480) resolution, also at 75 Hz. Standard features include 2MB of VRAM, dual-monitor output, and support for DRAM memory that serves as a performance-enhancing cache.

The lower-cost Renegade 1024 series offers 1MB of VRAM and supports a maximum resolution of 1024 by 768. It displays up to 256 colors at a 72-Hz screen refresh rate. The 1024 displays a maximum of 65,536 colors at VGA resolution, also 72 Hz.

Both Renegade series include a suite of drivers for Windows and popular DOS and CAD applications. They also provide display utilities such as pan and zoom. The ISA and VL bus versions of the Renegade 1280 list for $545; the EISA model is priced at $595. The Renegade 1024 is $425 for the ISA or VL bus version.

—Michael Desmond

Renegade 1024, 1280

Two new entrants in the Windows acceleration market promise fast performance for Windows and CAD applications.

Appian Technology Inc.
800/727-7426,
408/730-5400,
408/730-5473 (fax)
List price: Renegade 1280 $545/$595, Renegade 1024 $425
Reader service no. 650

Can ANYONE Make a 15-inch Monitor That's More Affordable Yet Outperforms The Fabulous MAG MX15F?

No Way?

What's new? Costs Less, And Is Better Than The Award-Winning MAG MX17F?

A Dream?

New and Improved

- MPR II
- Pincushion Control
- 16 Preset & 8 User Modes
- New Price!

PC MAGAZINE EDITORS' CHOICE

March 1993
MX 15F

Way!

New and Improved

- MPR II
- Pincushion Control
- Tilt Control
- 16 Preset & 8 User Modes
- New Price!

PC MAGAZINE EDITORS' CHOICE

July 1992
MX 17F

A Dream Machine!

Introducing the new and improved MX series. Once again, MAG InnoVision pushes the state-of-the-art in high-performance 15-inch and 17-inch color monitors. ■ Low electro-magnetic and static emissions that meet the Swedish MPR II guidelines are now standard. ■ We've increased the programmable timings to 16 Preset and 8 User to support new high-refresh video modes. ■ We've added pincushion and tilt* controls for distortion-free displays. ■ Best of all, we've made them more affordable. ■ Ask your dealer for a demonstration of the new MX15F and MX17F monitors. Or call us for more information at 800-827-3998, 714-751-2008 (in CA), FAX: 714-751-5522.

*© 1993, MAG InnoVision, Inc. All rights reserved. MAG InnoVision and its logo are trademarks of MAG InnoVision. All other brand and product names are trademarks or registered trademarks of their respective owners. *MX17F only.*

MAG InnoVision, Inc.
2801 South Yale Street
Santa Ana, CA 92704

MAG INNOVISION ™

Circle 169 on reader service card

Epson's ActionNote 4000: Power in a Small Package

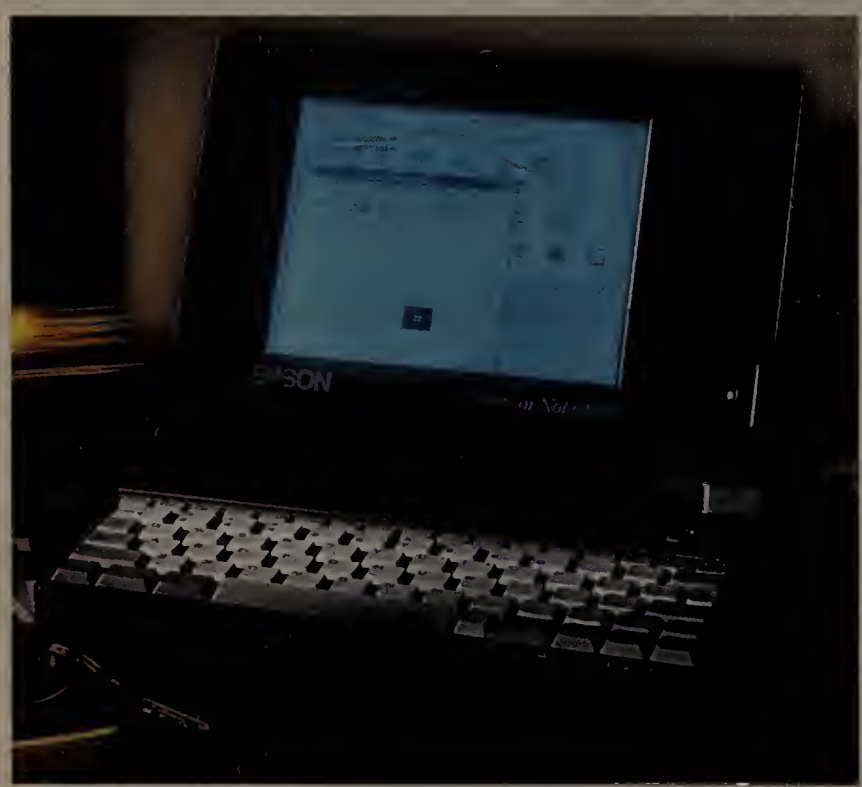
Epson ActionNote 4000
A Windows-ready subnotebook at a budget price.

Epson America Inc.
800/289-3776,
310/782-0770
Price: Under $2000
Reader service no. 651

Smaller doesn't always mean more expensive in a fully functional portable computer. Epson's latest offering is a case in point.

The 3.9-pound ActionNote 4000, which Epson says will sell for under $2000, trims an inch and a half off the side and front of the average notebook, measuring only 10 by 7 by 1½ inches. Into this decidedly petite parcel, Epson managed to pack nearly all the trappings of a full-size notebook, with a few tradeoffs. One is the 7½-inch monochrome backlit LCD screen. Although small, it's quite readable. The other compromise is battery life: Even with the unit's built-in power management, the nickel-cadmium battery runs just 2½ hours, according to Epson—on the short side for a notebook.

The unit's 80-key keyboard is comfortable to use and has a two-button trackball mounted on the upper right side above the keys. You can plug in a full-size external keyboard and regular mouse. Especially useful is the ActionNote's removable hard drive, available in 80MB and 120MB sizes. Rounding off the feature set is a PCMCIA 2.0 slot, along with serial, parallel, mouse/keyboard, and external video connectors. Included are sockets for extra RAM (up to 4MB) to fill out the original 4MB and for a math coprocessor to complement the 33-MHz Cyrix 486SLC processor. The only familiar notebook feature that's missing is the floppy disk drive, which comes standard as an external unit. Total traveling weight with the floppy drive, AC adapter, and other goodies is 5.2 pounds.



EPSON'S ACTIONNOTE 4000 SUBNOTEBOOK features a 7½-inch monochrome backlit LCD screen and weighs only 3.9 pounds.

To keep you up and running when you travel, Epson offers Extra Care Road Service, a toll-free call. Should the ActionNote fail in the line of duty, you can easily remove the hard drive to retain your valuable data while the computer goes back to the company. (Because the drive chassis has open circuitry and helps strengthen the subnotebook's case, Epson advises against frequent removal of the hard drive.) With a credit-card deposit for the cost of the ActionNote, which will be processed only if you fail to return the defective notebook, Epson will send you a replacement computer overnight anywhere in the United States.

—Bryan Hastings

Multimedia Boom Box

At about 20 pounds, the $6995 Thunderbox II Multimedia Portable is no lightweight: This is a system designed for people who require desktop PC power for audio and video presentations on the road.

This 16-by-9.5-by-7.8-inch lunch-box–style system from Lightning Computers provides significant processing power, a good display, lots of storage capacity, and impressive expansion capability. You may need a small cart to haul it around, but you can store it on a plane as a carry-on item.

The Thunderbox features a speedy 66-MHz 486DX2 processor and will be upgradable to Intel's OverDrive for DX2 when the chip ships sometime next year. (Lightning says it will also offer a $2500 system board upgrade with a Pentium chip installed.) The system includes VESA local bus video for fast graphics performance. A super-VGA card supports the 9.4-inch active matrix color screen at up to 640 by 480 resolution, and an external monitor at up to 800 by 600 resolution. The Thunderbox comes with 4MB of RAM (expandable to 256MB) and a 240MB hard drive. Larger hard drives, including a 2-gigabyte model, are available.

With five expansion slots, you have plenty of room to add a fax-modem, a network adapter, and sound and video boards. To keep the system weight (and the price) down, Lightning isn't bundling a CD-ROM drive or a full-motion video adapter with the multimedia Thunderbox. (A Toshiba 3401 CD-ROM drive, with a 200ms access time, is an extra $660.)

The Thunderbox comes with your choice of internal or external stereo speakers, DOS 5.0 or 6.0, and Windows 3.1. Additional processor, hard drive, audio, and network adapter options are available.

—Laurianne McLaughlin

Thunderbox Multimedia Portable
This luggable 20-pound PC is built for on-the-road multimedia presentations.

Lightning Computers
800/347-4486,
415/543-3111
List price: Starts at $6995
Reader service no. 652

The Next Generation Publisher...

PagePlus 2.0 for Windows

SPECIAL OFFER
$59.95
BUY DIRECT

PagePlus 2.0 is packed with hot new features that make it more powerful, yet easier to use, for all your publications. We've listened to our users, now PagePlus 2.0 can do just about anything you want – and then some. Check out this ad – *it's designed and produced using PagePlus 2.0 with full color separated output*. Now it's so easy for everyone to look good in print, and with our 60-day Money-Back Guarantee you've nothing to lose.

60 DAY MONEY-BACK GUARANTEE

NEW! Full Color Publishing including image colorize, Pantone® Color License and Full Process Color Separations. A major industry first!
NEW! Text Frames with unique column blinds give you the ultimate in text flow control.
NEW! Styles and Templates with AutoApply for great looking pages in a hurry.

	Serif PagePlus 2.0	Aldus PageMaker 5.0	Microsoft Publisher 1.0
Auto Text Flow	✪	✪	✪
Kerning	✪	✪	✪
Import Pictures	✪	✪	✪
Drawing Tools	✪	✪	✪
Rulers, Guides	✪	✪	✪
Multiple Zoom Levels	✪	✪	✪
Publishing Templates	✪	✪	✪
Irregular Text Wrap	✪	✪	
Styles	✪	✪	
Pantone® Colors	✪	✪	
Process Color Seps.	✪	✪	
Free Rotation	✪	✪	
Free & Frame Text	✪		
Export as Picture	✪		
ChangeBar	✪		

NEW! Export as Picture from PagePlus 2.0 to jazz up your WP document or spreadsheet.
NEW! Free Text lets you drag and drop text anywhere on the page or pasteboard.
NEW! Free Rotation of text and graphics. Wow!
NEW! ChangeBar technology for dynamic on-screen changes. It couldn't be easier.
NEW! Even More Goodies like movable rulers, hint line, CleanUp, Status Editor, OLE, TrueType...

It's a Winner!

PagePlus 1.2 is the Winner of the Windows User Award for "Best desktop publishing software" – the losers included MS Publisher, Aldus PageMaker and Ventura Publisher. Now, the best just got better – PagePlus 2.0 keeps Serif out in front. It's a Winner!

WINDOWS USER AWARD #1 BEST DESKTOP PUBLISHER

New Publishing Packs...

To add extra variety, we've intoduced three great new Publishing Packs. At just **$19.95** they're the lowest priced Windows add-ons. *For all your applications – not just PagePlus!*
NEW! TypePlus 2.0 for eye catching text effects. Type on an arc, circle, button or bezier curve.
NEW! ArtPack a professionally drawn collection of over 500 color images for superb results.
NEW! FontPack over 100 (yes, 100) TrueType classic and decorative typefaces!

Now try PagePlus 2.0 for just $59.95 in our Special Offer!

We're launching PagePlus 2.0 at just **$59.95** and our Publishing Packs at only **$19.95** each. It's only possible because you're buying Direct from the publisher – Serif gives you high-end products at entry-level prices. Better still, get everything in our BumperPack for **$99.95** and save another $20. (For education and larger groups you can get the BumperPack for *10 Users* for $249). Order now and find out for yourself why PagePlus 2.0 really is the Next Generation Publisher.

So call us Direct, or fax/mail the coupon today!

- **An Award-Winning Product, and already a Best Seller with over 50,000 enthusiastic users**
- **The Best Value *and* Lowest Price - why pay more?**
- **FREE Product Support and Low-Cost Upgrades**
- **A 60-Day, No-Quibble, Money-Back Guarantee**
- **Great Software, Direct from the publisher**

24-HOUR TOLL-FREE HOTLINE
800-697-3743

24-HOUR FAX ORDER LINE
800-869-8909

Great Software, Direct

YES! Please rush me...

- ☐ **PagePlus 2.0 @ $59.95**
- ☐ **TypePlus 2.0 @ $19.95**
- ☐ **ArtPack @ $19.95**
- ☐ **FontPack @ $19.95**
- ☐ **BumperPack @ $99.95**
- ☐ **10-User Pack @ $249**

I enclose a total* of $ .....
*Add $7 for S&H ($12 International).

Credit Card No. .....
Exp. Date .....
Signature .....
Name .....
Company .....
Address .....
City .....
State ..... Zip .....
Telephone (.....) .....

Please return to: PCW09
Serif, Inc.
PO Box 803
Nashua NH 03061
Or Fax Toll-Free to: 800-869-8909

SERIF

Serif, Inc. • PO Box 803 Nashua NH 03061 • Tel: (603) 889-8650 Fax: (603) 889-1127
Serif Europe • PO Box 15 Nottingham NG7 2DA England • Tel: +44 602 421502 Fax: +44 602 701022
NOTE: Please add $7 S&H ($12 international). Checks and Money Orders to SERIF, VISA, MasterCard, and American Express. Official POs from Education, Government and Fortune 1000. BumperPack is PagePlus and all Publishing Packs. 10-User Pack is BumperPack with Site License for 10 users in one location. You need Windows 3.1 or higher. All Serif product names are trademarks of Serif, Inc. All other trademarks acknowledged. **Like all Serif marketing materials, this ad was designed and color separated using PagePlus.**

Circle 225 on reader service card

Three New Packages Simplify Financial Chores

Let's face it, when it comes to managing our finances most of us could use a little help. Three new packages for consumers and small-business owners aim to give users more control over their finances—without taking a bite out of their pocketbook.

Parsons Technology's $49 MoneyCounts for Windows is the graphical version of the company's low-priced DOS personal and small-business financial management software.

With Intuit's Quicken for DOS and Windows holding the lion's share of the personal finance market, Parsons hopes that MoneyCounts' new reporting features, streamlined Windows interface, and easy links to Parsons' tax package, Personal Tax Edge, will attract home and small-business users. MoneyCounts for Windows also includes predefined charts of accounts for home users, small businesses, rental property owners, farms, and churches—the latter two being segments of the market that are not specifically targeted by any competing packages.

MoneyCounts for Windows features a checkbooklike interface to simplify data entry. The product allows users to establish multiple sets of books for managing separate home or business accounts; you can also choose to use a single-entry or double-entry accounting system.

MoneyCounts for Windows allows you to assign descriptive names to accounts. A reminder notifies users when payments are due or deposits should be made. You can also attach separate notes to customer or vendor accounts.

Another bonus is that MoneyCounts converts data from Quicken (DOS and Windows), Managing Your Money, Dollars & Sense, and Microsoft Money. For quick analysis of financial information, MoneyCounts for Windows includes a variety of financial reports, as well as 3-D bar and line graphs and pie charts for a graphical representation of financial data.

Payoff

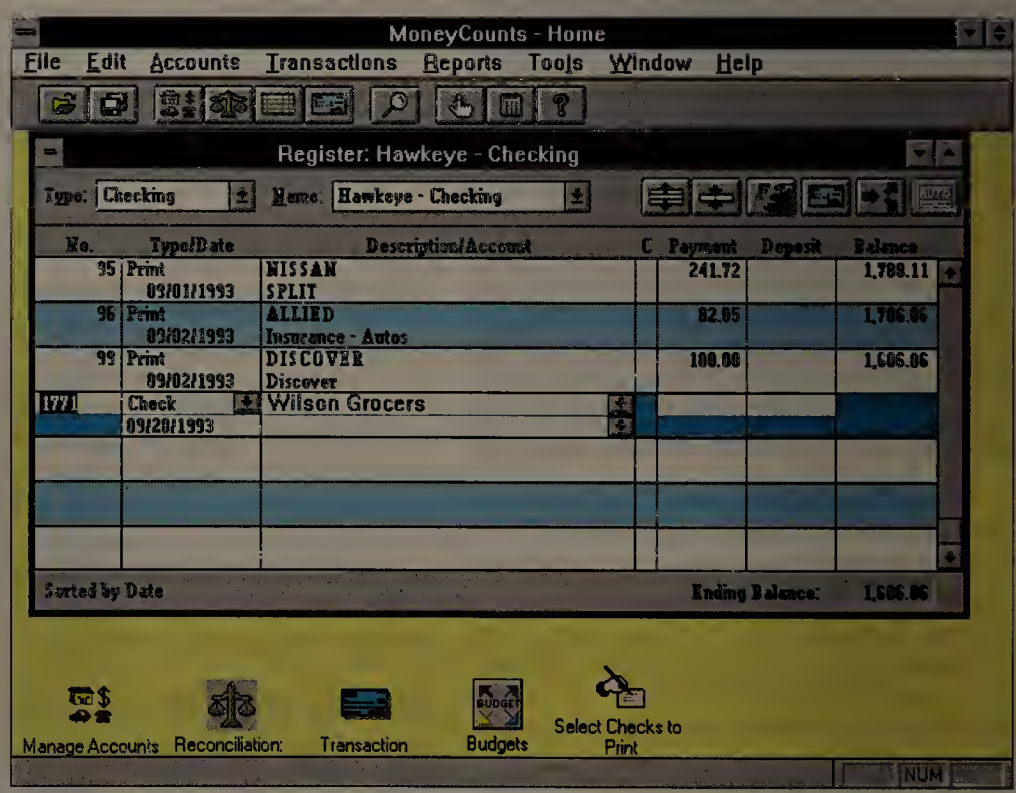
If your financial management needs are simpler—say you need to choose among home loan options—consider two new financial calculation utilities, Phadean Engineering's $79.95 Payoff 2.0 and Electronic Arts' $39.95 Financial Workshop. Both packages are designed to provide quick, detailed analysis of financial problems.

Payoff 2.0 loan analysis software demystifies loan options by analyzing such common alternatives as fixed versus variable-rate mortgages, or choosing between a low-interest car loan and an instant rebate from the dealer. Besides analyzing all the standard loan types, the program lets you specify any sequence or combination of alternatives, such as variable interest rates, accelerated loan payments, balloon payments, or skipped payments. Once you've entered the terms of your loan, Payoff calculates all the information you'll need: individual payment amounts, including amount paid to principal versus interest, outstanding balances, and total interest paid to date.

Financial Workshop

Financial Workshop includes interactive, on-screen examples of common questions about taxes, investments, savings options, and home mortgages. You'll also get detailed information about some overwhelming issues most of us need to tackle at some point—retirement planning and saving for a child's college education, to name a couple. Online help provides users with advice on traps to avoid when making important financial decisions.

—Roberta Furger



MONEYCOUNTS FOR WINDOWS' checkbook interface simplifies data entry. You can create multiple sets of books for home or business accounts.

MoneyCounts for Windows

Home and small-business financial software includes predefined charts of accounts.

Parsons Technology
800/223-6925,
319/395-9626
List price: $49
Reader service no. 660

Payoff 2.0

Help is just keystrokes away with this comprehensive loan analysis tool.

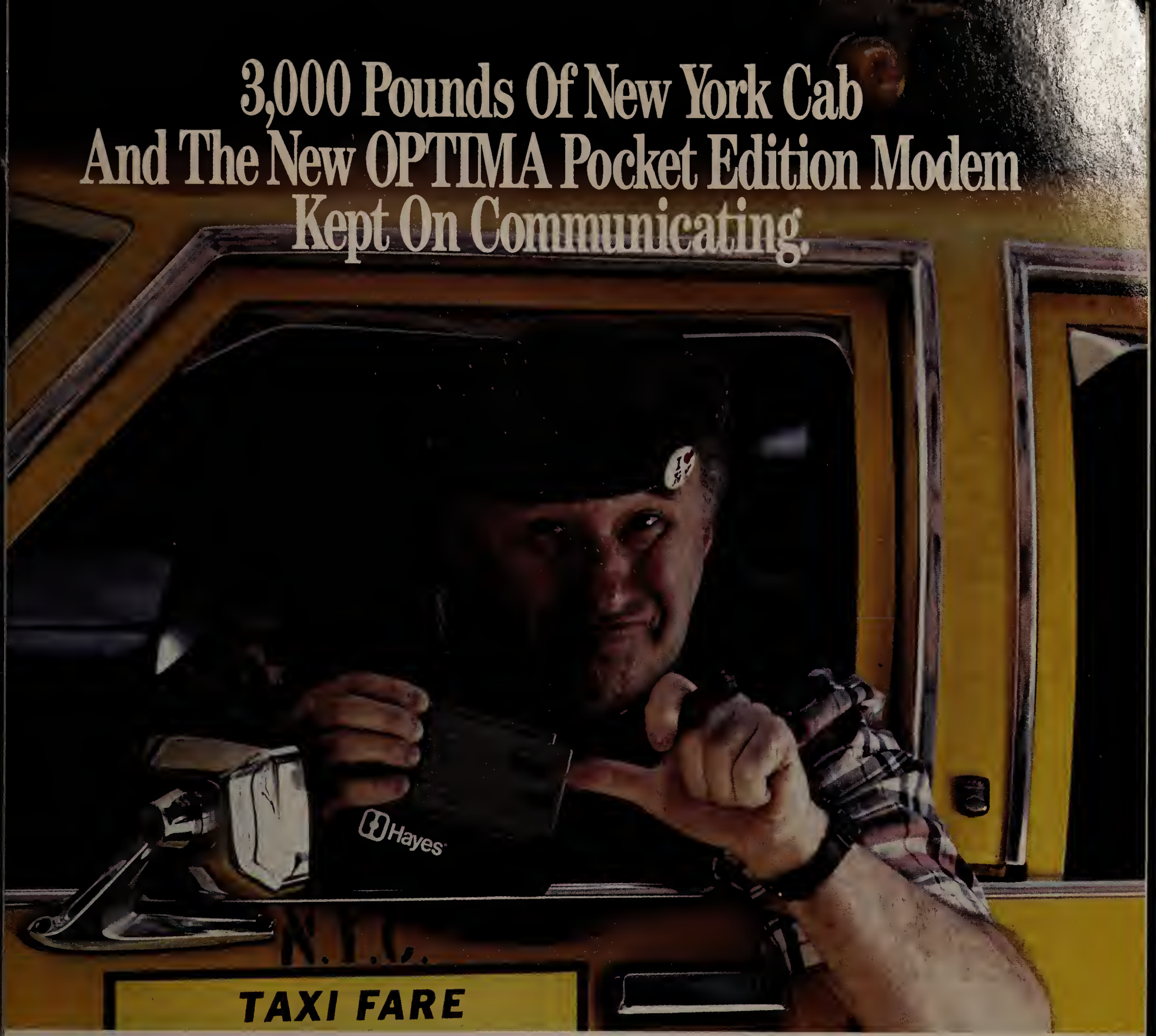
Phadean Engineering
508/869-6077,
508/869-2185 (voice and fax)
List price: $79.95
Reader service no. 661

Financial Workshop

Obtain quick answers to common financial questions about everything from home and auto loans to education and retirement planning.

Electronic Arts
800/245-4525,
415/571-7171
List price: $39.95
Reader service no. 662

3,000 Pounds Of New York Cab And The New OPTIMA Pocket Edition Modem Kept On Communicating.



OPTIMA™ 144 + FAX144 Pocket Edition®

Picture this. It's four o'clock and you've closed the deal. But, you need to check the inventory data base at the plant and FAX the order confirmation by five. You jump out of the cab. Your portable modem falls. The cabbie takes off, and *crunch*. Now what? Well we ran over our new OPTIMA™ 144 + FAX144 Pocket Edition® in its soft carrying case and the OPTIMA still communicated ... flawlessly.

Now we're not recommending *you* try this, but who knows what can happen on the road. What's important is that the OPTIMA Pocket Edition is from Hayes. It's for your PC or Mac.™ And its got it all. 144 speed. The convenience of FAX. Data throughput to 57.6kbps. Hayes Standard AT Command Set. Hayes® AutoSync to communicate synchronously with mainframes. AC or battery power. **And, Smartcom™ communications software that includes the new Smartcom for Windows,™ Smartcom Exec® and Smartcom FAX for DOS, and Windows FAX software. All, absolutely free!** And it's all backed by our fast, efficient Technical Support team.

Macintosh Edition also available

So whether you're on the road or work out of the office, the OPTIMA 144 + FAX144 offers you the durability, reliability, speed and FAX you need at a very affordable price. For your nearest dealer or product literature, call **1-800-96-HAYES.** In Canada, call **1-800-665-1259.**

Hayes®

Why settle for anything less? Hayes products have the computer world talking. More than ever.

Go *Online With Hayes* BBS; call 800-874-2937 or 404-446-6336.

©1993 Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348. Hayes, the Hayes logo, Smartcom Exec, and Pocket Edition are registered trademarks and OPTIMA, Smartcom, and the Hayes '302 Escape Sequence Patent icon are trademarks of Hayes Microcomputer Products, Inc. Other trademarks mentioned are trademarks of their respective companies.

Circle 105 on reader service card

The Intelligent Form Replaces the Paper Trail

Delrina FormFlow 1.0
Take the paper out of the paper trail with a forms software package that includes Intelligent E-mail routing and full database support.

Delrina Corp.
800/268-6082,
408/363-2340 (fax)
List price: Manager component $399, 10-user network package $1840
Reader service no. 653

Expense reports, contact summaries, vacation requests, and memos. The relentless tide of paper can daunt the bravest soul, but Delrina Corporation hopes to offer some relief by taking the corporate paper trail digital. FormFlow is a Windows-based forms design and management package that brings intelligence to those stubborn sheets of paper to expedite tasks.

Like Delrina's PerForm Pro line before it, FormFlow lets you create, manage, and fill in forms on your PC. It features the same visual, object-driven design approach, which makes it consistent and easy to learn, and lets you plug into databases to update data captured on forms. FormFlow also acts as a front end for databases. The program can read from and write to common file formats such as dBASE, Paradox, and ASCII, which makes it highly compatible with existing systems. In addition, FormFlow lets you work with relational databases (not a given with forms products), as well as associate a single form with several databases or several forms with a single database.

Forms are created in the Designer module using tools found on convenient, if somewhat cryptic, icon bars. In this module, designers create and identify input fields; place borders, graphics, and text; and initiate links to external databases and E-mail packages. Because FormFlow is a group application, the program includes password security and executive privileges, allowing designers to control access to important data links and routing schemes.

A high-level, BASIC-like programming language called Intelligent Forms Language (IFL) gives you greater control and customization of forms. IFL lets administrators design forms with conditions and rules for moving forms around the office and storing data. FormFlow supports all major E-mail standards so it can hook into a network and send forms over the wire. This lets you route employee expense reports, for example, directly to accounting—unless a specific condition, such as an expense over $500, causes the form to be routed to a supervisor for review first. Supervisors can then "sign" forms on screen using personal codes. The result: No more lost documentation, repeated submissions, or sluggish internal mail to worry about.

FormFlow's Manager component for designing forms lists for $399, while User Packs vary by the number of network nodes. A ten-user network package, for instance, lists for $1840.

—Michael Desmond

CREATE, MANAGE, AND FILL IN FORMS with FormFlow from Delrina.

Easy and Cheap Forms Creation

In an era of hopelessly bloated software, it's nice to see programs that won't overtax your system, much less your budget. Form Creator, a DOS-based forms design and entry program from Parsons Technology, doesn't claim to be a one-stop solution for businesses looking to automate paperwork. But if you need to lay out forms, manage on-screen entry, and perhaps save data to a file, Form Creator delivers for as little as $29.

Form Creator's design mode lets users create customized forms with specific field characteristics, defined order of entry, and boxes and borders. The program lets designers use the mouse to click and drag items, making it easy to set up fields and graphic elements, while drop-down menus provide command cues. Once you create the documents, you can output them as paper forms for written entry or store them as on-screen templates for computer entry.

In addition to keyed input, Form Creator accepts comma-delimited ASCII files, letting businesses tap into information stored on databases and spreadsheets. Data entered in Form Creator can be exported in ASCII format. The program can print to a variety of printers.

Form Creator lists for $49 but is available direct from Parsons Technology for $29. The software requires a system with at least 512K of RAM (640K recommended) and 2MB of free hard disk space.

—Michael Desmond

Form Creator
A simple, low-cost forms design and entry program that won't tax your hardware or your wallet.

Parsons Technology
319/395-9626,
319/395-0102 (fax)
List price: $49, direct $29
Reader service no. 654

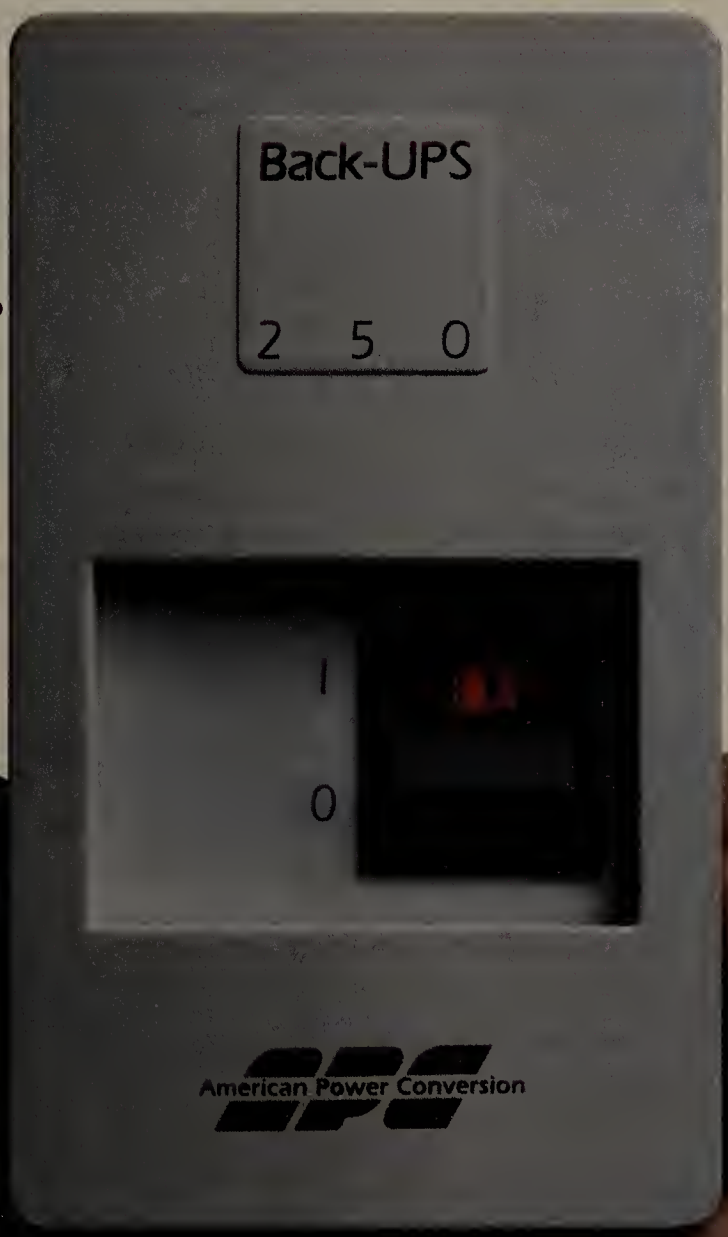
Get a hold of the best value in LAN power protection

Now just $139!* suggested list price

Blackouts, brownouts, sags... Your data and hardware are vulnerable to problems that surge suppressors and power directors are just not equipped to handle.

Now there's a complete Uninterruptible Power Supply solution to suit any budget. The Back-UPS™ 250 is reliable protection for LAN nodes, 386SX machines, 286, small PS/2 systems, and internetworking hardware such as routers, bridges, gateways and repeaters.

From the largest server to the smallest router, the Back-UPS Series will increase your productivity by providing a cost-effective solution to power problems. Call for your free power protection handbook.



The **Back-UPS 250** offers even more cost-effective protection for LAN nodes (typical runtime for a 386SX system is 10 minutes).

NEW!

Guaranteed ABSOLUTE™ Protection

- ABSOLUTE™ Protection guarantees repair or replacement of equipment (up to $25,000) if damaged by a surge while protected by a properly installed Back-UPS (See warranty for details).
- UL, CSA and Novell approved with a 2 year warranty
- Full-time surge protection and line filtering
- Most models include LAN interface for automatic-shutdown of Novell, LAN Manager, LAN Server, LANtastic, Banyan, SCO Unix, and others
- Ask about PowerChute® UPS monitoring software and Novell compatible UPS monitoring boards
- 230V models available

LAN TIMES READERS CHOICE 1992 1991, 1990

Computer Reseller News Editors' Choice

Model	Application	List	New List
Back-UPS 250	LAN nodes, 386SX, 286, internet hardware, POS	~~$169~~	$139
Back-UPS 400	Desktop 386, 486 systems, 286 servers	~~$249~~	$229
Back-UPS 450	Tower 386, 486 systems, servers	~~$329~~	$279
Back-UPS 600	Heavily configured systems, CAD/CAM workstations	~~$449~~	$399
Back-UPS 900	Multiple systems, longer runtime applications		$599
Back-UPS 1250	Multiple systems, LAN hubs, small minis, telecom equipment		$799

NEW!
NEW!

The Back-UPS™

by American Power Conversion

(800)800-4APC, Dpt. P3

APC 132 Fairgrounds Road, West Kingston, RI (401)789-5735
APC Europe TEL: (+33)1.64.62.59.00 FAX: (+33)1.60.17.80.29

©1992, Back-UPS, PowerChute, Guaranteed ABSOLUTE Protection are trademarks of APC. All other trademarks are property of their respective owners.

Circle 45 on reader service card

A Convenient Way to Switch Between Video Resolutions

AnyView

WINDOWS Change resolutions without exiting Windows.

Binar Graphics
415/491-1164,
415/491-1565
List price: $99, introductory price $69.95
Reader service no. 655

Fantastic Recall

WINDOWS Start Windows—and your Windows applications—where you left off.

Binar Graphics
800/228-0666,
415/491-4182
List price: $79.95, introductory price $49.95
Reader service no. 656

For most users, Windows is full of hassles. Here are two of them: Although your video card may support several resolutions (640 by 480, 800 by 600, 1024 by 768, and so on), you can't conveniently switch between them. And when you load Windows, it doesn't bring you back to where you were when you exited. Programs by Binar Graphics, AnyView and Fantastic Recall attempt to solve these problems.

AnyView checks out your hardware at installation, then lets you change your video driver—and with it your resolution—on the fly. If you've been working at 1024 by 768, and you decide you'd prefer to work in 800 by 600, just click the appropriate icon and there you are, without exiting Windows or closing any applications.

What happens if you pick a resolution that doesn't really work with your hardware, and you're left with a blank or unreadable screen? You hot-key back to the previous resolution. Also, the program rewrites SYSTEM.INI when you change the resolution, so you can always edit it back in DOS.

You can also associate resolutions with applications. You can, for instance, assign 1024 by 768 to Quattro Pro, where you need to see a large worksheet, and 640 by 480 to Ami Pro, where you want large letters. As you move from one app to another, your resolution changes.

AnyView sports a few other useful features. You can turn the screen into a scrollable window on a giant virtual desktop. And if you ever thought that those rulers in design-oriented programs looked wrong, AnyView lets you set the number of pixels that equate an inch. You can define this setting—while holding a physical ruler up to your screen—for each resolution your system supports.

If you like to start work each morning where you left off the night before, Fantastic Recall is worth considering. When you exit Windows through Fantastic Recall, it copies memory to a disk file; when you run the command-line program in DOS, it restores from the file to memory, returning you to Windows with your apps running and your data files up, exactly as you left off. That's a lot more energy efficient than keeping your system on all night. The program also has an autosave feature to copy memory to disk.

—Lincoln Spector

WordPerfect Presents Multimedia

These days it takes more than bulleted text charts and 3-D graphs to captivate an audience. Fortunately, Presentations for Windows 2.0 lets you turn ordinary dog-and-pony shows into multimedia events.

WordPerfect Presentations for Windows 2.0

WINDOWS This sophisticated presentations package handles sound and video as well as charts and graphs.

WordPerfect Corp.
800/451-5151,
801/225-5000,
801/222-5077 (fax)
List price: $495
Reader service no. 657

The $495 Presentations 2.0 lets you incorporate sound and video clips into on-screen presentations and has an integrated outliner, sophisticated drawing and charting, prefab slide templates, and a slide sorter.

The program comes with 100 sound files, from applause to jazz to country music. Each slide can contain one MIDI sound clip plus a digital audio track, letting you add narration or an audio selection from a CD ROM. You can create OLE links to Microsoft's Video for Windows and run full-motion animation or video clips from inside a slide show. Spark up your shows by importing clip art from Presentations' gallery of over 1000 images, or scan a picture directly into the program.

WORDPERFECT PRESENTATIONS 2.0's SPLIT-SCREEN VIEW makes it easy to edit presentation slides quickly.

Presentations 2.0 sports a button-bar style interface and a floating tool palette. A split-screen option lets you simultaneously view and update your outline or data table and slides. Upgrades from competing packages cost $129; users of the DOS version can upgrade to the Windows package for $99.

—Daniel Tynan

MICROSOFT WINDOWS COMPATIBLE

For "Smooth Operation" Try The Award Winning PC Trackball II!

Windows Magazine chose the PC Trackball II as one of the top 100 products of 1992. The Mouse Systems' PC Trackball II combines high-resolution fingertip control, compatibility, and space saving ergonomics into a small yet powerful package.

1993 ANNUAL WINDOWS 100 W MAGAZINE WIN AWARD

Equipped with Mouse Systems' advanced drivers, the PC Trackball II can achieve resolutions up to an astounding 30,000 cpi. Its variety of acceleration curves and button reasignments make it the envy of all trackballs! And its ergonomic design is perfect for right-handed or left-handed users.

Mice - Trackballs - Scanners - Peripherals!

So, put the PC Trackball II on your desk and give it a try. We think you'll like the "smooth operation" just as much as Windows Magazine did. At Mouse Systems we've been building quality input devices for over ten years. You won't find a better product than the PC Trackball II. See your dealer or call our Fax-Facts service at (510) 226-1762.

CALL (510) 656-1117

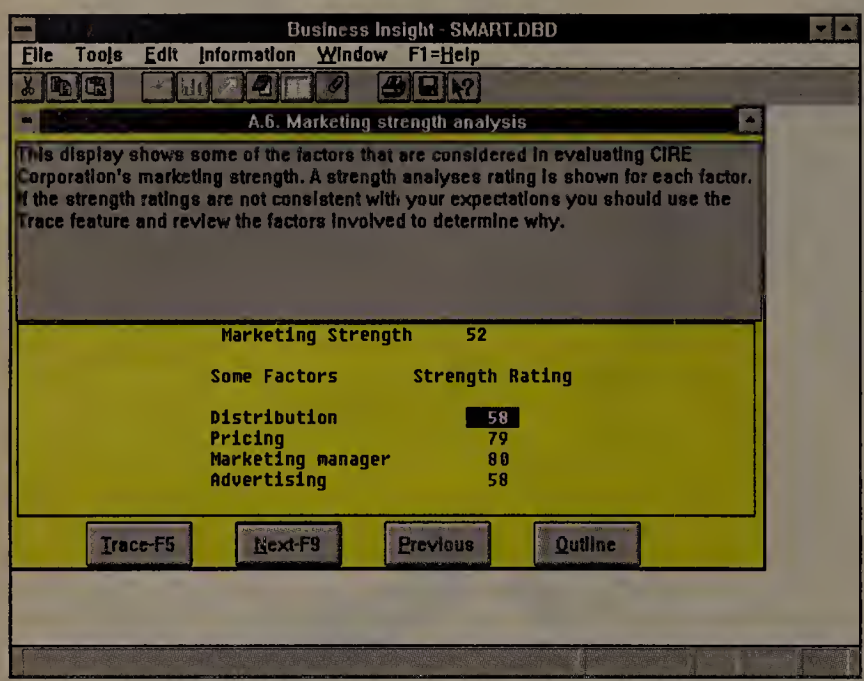
MOUSE SYSTEMS

Maker Of The Worlds Most Reliable And Accurate Input Devices Since 1982!

Mouse Systems Corporation, 47505 Seabridge Dr., Fremont, CA 94538 (510) 656-1117, (510) 656-4409 Fax
All trademarks are the property of their registerd owners.

Circle 160 on reader service card

Business Insight: Like Having an MBA on a Disk



TO AVOID COSTLY MISTAKES, RATE YOUR ENTERPRISE'S CHANCES for success with Business Insight's score-card report.

Business Insight offers the counsel of business experts to help you run your business or start an enterprise. It first interviews you about your company, then searches its reservoir of business management knowledge and strategy to analyze your firm and suggest improvements.

Business Insight's designers, both with management backgrounds, constructed the program's knowledge base using the work of 35 business experts, including Harvard economics professor Michael Porter.

An outline format makes this Windows program easy to use and understand. You start by answering questions about strategic business areas such as personnel, product benefits, buyer objectives, and the competition. You don't need to have a degree to answer the questions—terms are defined, and most questions are either multiple choice or scaled. Some require financial data, such as projected startup expenses, and you can use Business Insight's integrated spreadsheet, or import data in WKS format.

Once you're done, the program generates several reports. Business Insight acts as a critical outside adviser in its "score card" report, which rates your enterprise's chances for success in key areas such as product positioning, competition, and profit potential. It gives an assertion rating from 1 to 100 for each area. The program lists the factors that contribute to each rating, so you can review its logic. Business Insight then offers recommendations for improvement and points out inconsistencies in your strategy.

A top ten list shows the ten strongest and ten weakest aspects of your business strategy. Again, each rating is explained. Another helpful feature shows the pros and cons of what-if scenarios, such as "What if I enter the market early?"

A written critique of your strategy combines this information and can frame a formal business plan.

Business Insight can not only help you start a business but develop new strategies as your product and market change.

—Laurianne McLaughlin

Business Insight

WINDOWS This Windows program uses a knowledge base of business rules and theory to analyze ventures and offer suggestions.

Business Resource Software Inc.
800/423-1228,
512/251-7541
List price: $495
Reader service no. 658

PlanMaker Helps You Write a Business Plan

Composing a business plan that's good enough to attract funding is never a small task—and if you don't like to write, it could mean spending long hours in front of a blank screen. DOS-based PlanMaker provides an easy-to-follow structure and three sample plans that can save nonwriters time and irritation.

PlanMaker

This DOS-based software helps nonwriters create a business plan with its Q&A section and financial module.

PowerSolutions for Business
800/955-3337,
314/421-0670
List price: $129
Reader service no. 659

This $129 software first gives general instructions, then leads you through a questionnaire that covers all the chapters of a business plan: an executive summary, a company profile, objectives, management, product/service, market analysis, marketing strategy, manufacturing, and summary and use of funding. For each chapter, the software asks a series of questions and provides space to answer them. This isn't fill-in-the-blanks—PlanMaker wants you to write full sentences, to be cut and pasted into the final document later.

Here the samples come into play. If you're stuck answering a question, you can pull up a sample business plan and read the corresponding section. The software lets you copy and paste text from the samples, then edit it. However, the writing style in the samples may not "sound like you" or reflect your age or knowledge base. We found the samples most useful for stimulating ideas.

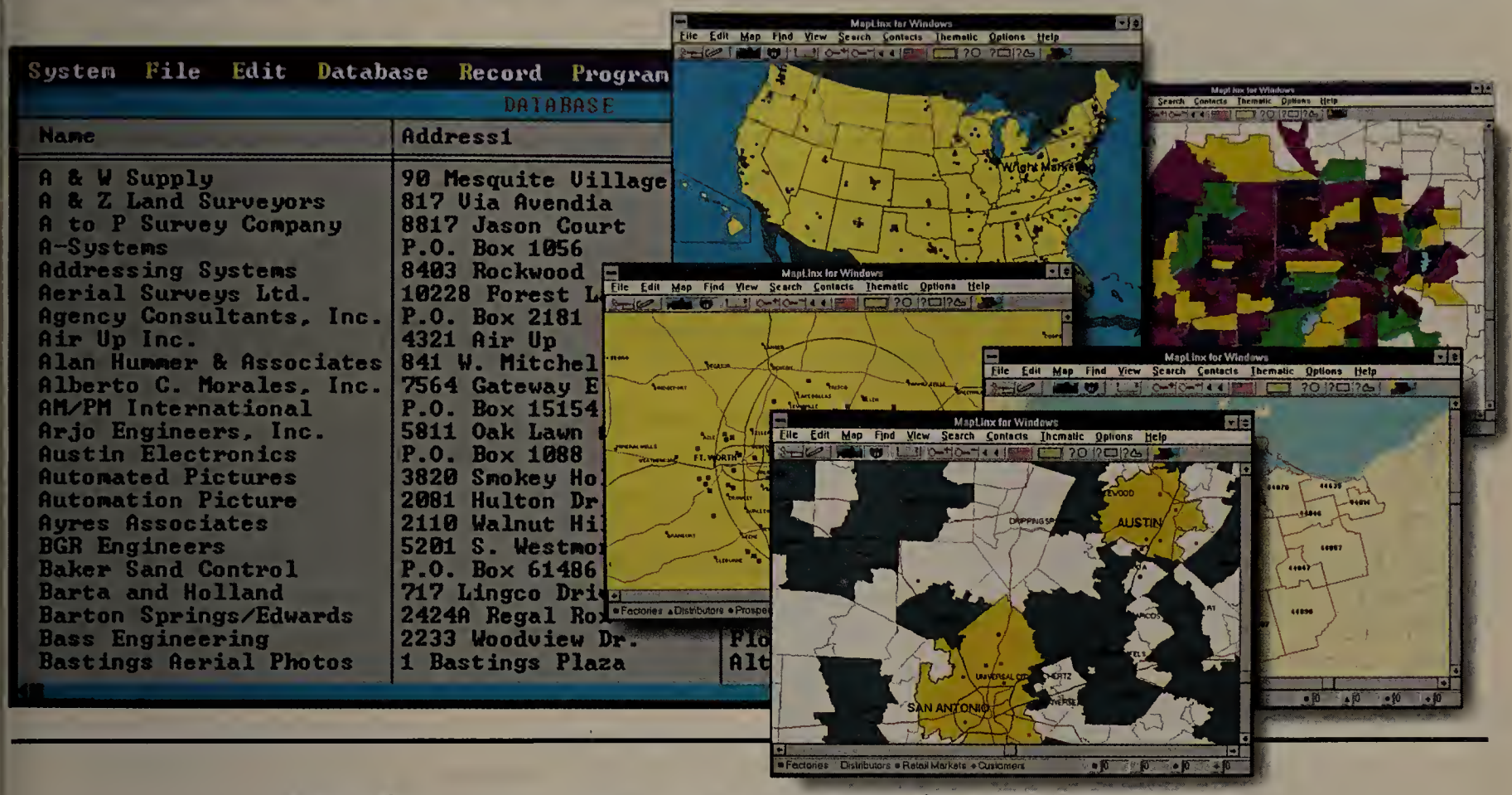
PlanMaker also generates the necessary financial statements, including a 12-month pro forma, a three-year projected income statement, cash flow projection, and balance sheet, current and projected. Enter the basic information, and PlanMaker performs the calculations (debt schedule, taxes, depreciation, and so on).

PlanMaker doesn't provide built-in charting, but if you dislike writing, you're bound to like PlanMaker's samples and on-screen workbook.

—Laurianne McLaughlin

THIS IS YOUR DATABASE.

THIS IS YOUR DATABASE ON MAPLINX.



MapLinx plots your data on detailed U.S. maps – giving you incredible planning, analysis and decision-making power!

You're sitting on a gold mine. A database full of names and addresses, sales figures or other information that *should* be your most valuable asset in making good decisions.

But are you really getting the most out of it?

You will, with MapLinx for Windows. MapLinx automatically plots your data on U.S. maps accurate all the way down to individual zip codes and highways. For the first time, you'll be able to *see* your data – for incredible planning, analysis and decision-making power!

Put your business on the map.

Across America, business professionals are using MapLinx to geographically analyze sales, service and competitive activity. To distribute leads, create balanced territories, and plan mailings and advertising with rifle-shot accuracy.

MapLinx is a *must* for planning local or out-of-state travel. It highlights prospects and customers within a given distance of a point, so you can efficiently "group" your appointments. You can even print hardcopies and plan your trips right on the map!

MapLinx is also a great tool for referring callers to their nearest dealer, service center, doctor or agent – depending on your business. It's perfect for planning service routes, analyzing store locations and much, much more. If you have a database, you *need* MapLinx!

Ideal for users of:

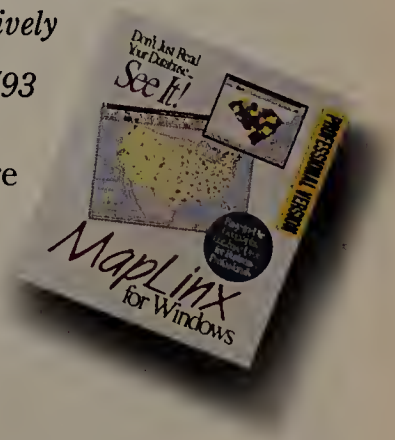
- Access, Approach, Paradox and other Windows databases.
- ACT!, PackRat and other Windows contact managers/PIMs.
- Excel, Quattro Pro and Lotus 1-2-3 for Windows.

"MapLinx is a classy, easy-to-use, relatively inexpensive tool."

InfoWorld, 3/15/93

Limited-Time Special Offer!

As part of a limited promotion, we're offering MapLinx for Windows at the remarkable price of only $299.95 (reg. $399.95). Available through Egghead and other software stores. *Call to order or for more information!*



MapLinx for Windows

EGGHEAD SOFTWARE
North America's Software Experts.

60 Day No-Hassle Money Back Guarantee!

1-800-344-4323

System Requirements: IBM AT, PS/2 or 100% compatibles; Microsoft Windows® 3.0 or higher; DOS 3.3 or higher; 2 Mb RAM; EGA, VGA, XGA or SVGA video card; Microsoft® or compatible mouse.

©Copyright 1993, MapLinx Corporation, 5068 West Plano Parkway, Plano, TX 75093-5099 Phone (214) 231-1400. All trademarks shown are the property of their respective companies.

Circle 161 on reader service card

Fastback Is Back in Style With Significant New Features

Fastback Plus 6.0, Fastback for Windows 1.1, Fastback for OS/2, Fastback Express 2.0

New networking and notebook features help this product reassert its reputation as one of the premier PC backup programs.

Fifth Generation Systems
800/873-4384,
504/291-7221
List price: Fastback Plus for DOS, Windows, or Macintosh $149; upgrade from earlier versions $49, DOS 6.0, and competing backup utilities $69; Fastback Express $59
Reader service no. 664

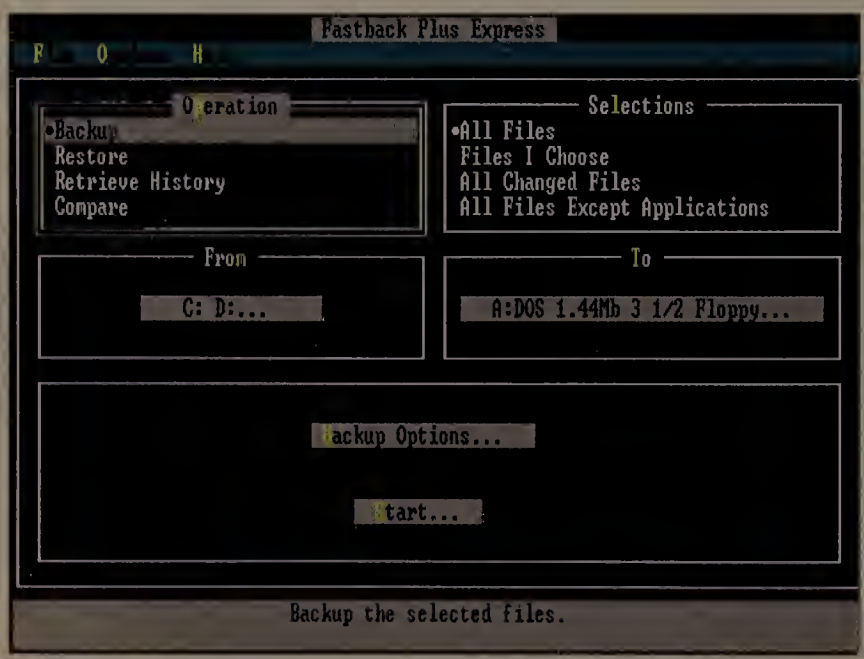
Developers of utilities software are responding to MS-DOS 6.0 with aggressive feature-packed versions. One notable entrant is the latest Fastback Plus, Fifth Generation Systems' backup program. Significant additions in Fastback 6.0 include virus scanning on the fly, notebook-to-desktop-device backup, a file viewer, extensive network features, and support for SCSI and other tape backup devices—none of which you'll find in DOS 6.0.

Fifth Generation also brought out its first version of Fastback for OS/2; an updated version, 1.1, for Windows; and version 2.0 of Fastback Express, an entry-level DOS backup utility with no tape support.

The update to Fastback Plus starts with a friendly new interface. Most operations—backup, restore, compare—can be launched with <Enter>, while the highly detailed menus of past versions are available to power users. But the improvements go deeper. The new virus scanner lets you hunt for viruses at any time, although you'll need another program, such as Fifth Generation's DiskLock, to rid yourself of any you find. Also, long overdue support for QIC 40, QIC 80, and SCSI tape drives is now included. Users can back up to tape drives across the company network, and notebook users can back up to any device available to their desktop computer.

The Fastback Plus versions for OS/2 and Windows are fully optimized for those environments, with REX scripting support and true multitasking under OS/2. The Windows version supports drag-and-drop selection of files for backup, a customizable button bar, and Dynamic Data Exchange, which allows Fastback to be linked to other applications in Windows and Windows for Workgroups. A particularly useful feature of both the OS/2 and Windows products is one-disk, one-key recovery from operating system failures.

—Joe Abernathy



FASTBACK PLUS 6.0'S IMPROVED INTERFACE makes it easier to launch most backup operations.

Stacker and XtraDrive Safer, Easier

Stacker 3.1, XtraDrive 3.0, XtraDrive Lite

Three upgraded data compression products offer better performance and ease of use.

Stac Electronics
619/431-7474,
619/431-0880 (fax)
List price: Stacker 3.1, $149
Reader service no. 663

Integrated Information Technology
800/832-0770,
408/727-1885,
408/980-0432 (fax)
List price: XtraDrive 3.0, $79.95; XtraDrive Lite, $34.95
Reader service no. 665

The latest versions of Stac Electronics' and Integrated Information Technology's (IIT) data compression products promise DOS 6.0 compatibility, greater ease of use, and enhanced safety features to protect your hard drive from corrupted files and lost data.

Stac's new Stacker 3.1 for Windows and DOS integrates its compression technology with DOS 6.0. Stacker replaces DoubleSpace, the tepidly received data compression utility bundled with the newest DOS. Stacker 3.1 is compatible with earlier versions of DOS as well.

With DOS 6.0, Stacker 3.1 drivers are added to the DOS kernel, so you won't need to add Stacker commands to your CONFIG.SYS file. All DOS commands work on Stacker drives. Stacker 3.1 can create compressed drives as large as 2 gigabytes, and its Unstack command will return a Stacker drive to its uncompressed state. Stacker 3.1 lists for $149. Upgrades from Stacker 3.0 are priced at $19.95.

IIT's $79.95 XtraDrive 3.0 now supports removable media. XtraDrive also loads a limited version of itself onto compressed floppy disks automatically, so that other PCs can read and write to them. Plus, XtraDrive 3.0 is 20 percent faster than its predecessor, according to company officials.

XtraDrive 3.0 supports compressed drives as large as 2 gigabytes. Its online help utility is now faster and features an improved interface.

For 286 and 386 PCs with smaller hard drives, IIT now offers XtraDrive Lite. Priced at $34.95, XtraDrive Lite supports only hard drives as large as 100MB, and it doesn't support removable media.

—Jeff Bertolucci

COREL DRAW!

The Best in Graphics ...and more!

Get animated with CorelDRAW 4!

PAGE LAYOUT
CHARTING
ILLUSTRATION
PHOTO-PAINT
TRACING/OCR
PRESENTATIONS
FILE MANAGEMENT
ANIMATION

CorelDRAW is renowned for its powerful graphics capabilities. CorelDRAW 4 now leaps even further ahead by adding page layouts, animation and OCR, as well as hundreds of other feature enhancements. It's the best value in software today–and it's still the easiest to use!

CorelDRAW 4 is the ideal desktop publishing tool! It includes illustration, charting, photo-editing, tracing/OCR and presentation capabilities...and so much more! There are advanced word processing features, multi-page layouts and dozens of artistic and special effects. It's packed with more fonts, more clipart images and symbols, more graphic tools and business applications. And now CorelDRAW 4 also includes CorelMOVE, a brand new animation module.

- **Comprehensive DTP Features**
- **Flexible Multi-Page Layouts**
- **Enhanced Word Processing**
- **Advanced Direct Scanning**
- **Powerful OCR (Optical Character Recognition)**
- **Single-Step Business Forms Tracing**
- **Thousands of Fractal Textures and Fills**
- **Dazzling Artistic Tools and Special Effects**
- **Convenient Spreadsheet and over 80 Chart Styles**
- **Object Data Management**
- **Over 5,000 "Drag and Drop" Symbols and Shapes for faster, easier selection and placement**
- **Over 18,000 Clipart Images and Symbols**
- **Over 750 Fonts (650 Bitstream and ITC)**
- **Complete Color Separations**
- **On-line Help**
- **20 Photo-Paint Filters and 14 Image Correction Filters**
- **37 Import/Export Filters**
- **21 Transition Effects**
- **125 CorelMOVE Animations and 420 Cartoons**

Create Dazzling Illustrations

18,000 CLIPART images and symbols

750 FONTS

ITC Licensed FONTS

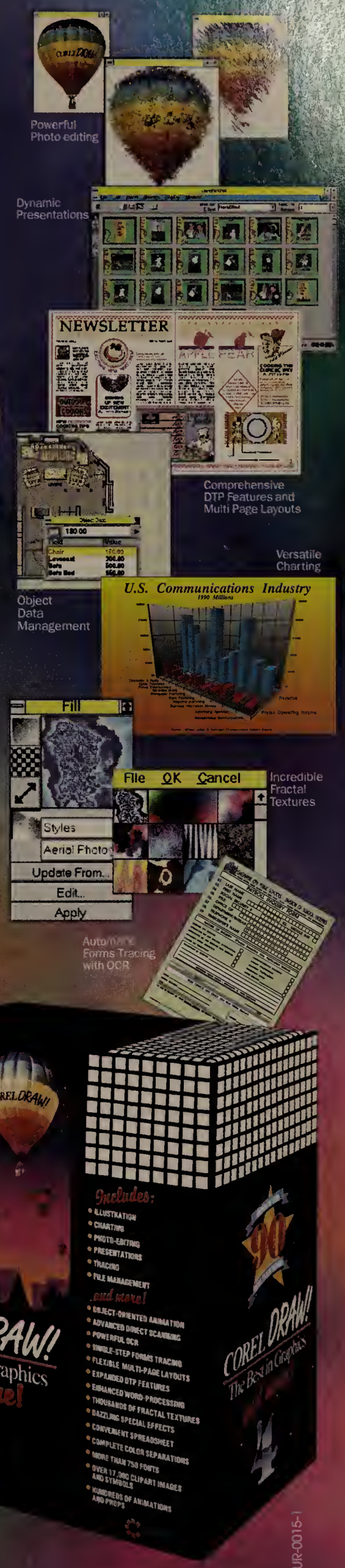
Bitstream

ONLY **$595** U.S. FUNDS

Registered User Upgrade $249

CorelDRAW 3 – Now Only $199!

ALSO INCLUDES TWO BONUS CD-ROMs
–featuring a complete CD version of CorelDRAW 4 plus libraries of clipart images and symbols, fonts, animation and sound, and a Video for Windows enhanced QuickTour.



COREL
United States and Canada
1-800-772-6735
ext.23

MICROSOFT® WINDOWS™ COMPATIBLE

KUR-0015-1

Circle 92 on reader service card

Modest E-Mail: Notework Version 2.0 Gets the Job Done

When you're shopping for E-mail packages, it's easy to be seduced by high-end features, such as rules-based messaging that can automatically route mail to other users or into specific folders. But if your needs are more modest, a recent upgrade to a solid product warrants your consideration.

Notework Corporation beefs up its easy-to-use Notework E-mail product to better address the needs of larger organizations. Version 2.0 handles up to 50,000 users spread across 100 different servers, without having to dedicate one server as a mail server. (The previous product was limited to 3500 users on 14 servers.) Version 2.0 also supports Novell's new Global Message Handling Service protocol, which makes it easier for the product to communicate with other types of E-mail systems, particularly those used in UNIX and mainframe environments.

A host of new end-user features addresses other former shortcomings. Notework previously limited user addresses to a single eight-character name. If you had two people in the directory with similar names—a distinct possibility in a large company—it was difficult to keep their names straight. Version 2.0 now supports full addressing with first and last names.

Notework also facilitates addressing the same message to recipients with local, remote, or fax addresses. (The previous version forced you to send separate messages to local, remote, and fax addressees.)

Smaller improvements to the product include carbon copy and blind carbon copy message handling. In addition, there's an intelligent subject feature that plugs the first sentence of a note into the subject area if the sender forgets to include a subject, so recipients will know what to expect.

By striving to be consistent between Windows and DOS versions, Notework lacks some of the conveniences Windows users may have come to expect. In particular, the product's inability to resize the message window is frustrating; if you have a long message to read, you'll have some scrolling to do. You also can't add fonts or colors to message replies. Instead, Notework differentiates new additions to a "thread" (a message with multiple replies) by labeling blocks of text. This can turn a long thread into a confusing mess.

Finally, Notework 2.0 can't create different folders for filing messages, nor does it include file viewers.

—Randy Ross

Notework 2.0

WINDOWS

This easy-to-use E-mail product for DOS and Windows is now even easier and more powerful.

Notework Corp.
800/767-6683,
617/734-4317
List price: $199 plus $45 per user (10-user minimum), $30 per user for more than 5000 users
Reader service no. 666

THE NOTEWORK 2.0 DOS and Windows E-mail program supports full addressing with first and last names.

Improve Remote Communications

RemoteWare is a suite of software tools that streamline the flow of information between your headquarters, branch offices, and mobile workers. Consisting of a set of miniapplications called AppliComms, RemoteWare now offers nearly 100 new features, including enhanced forms routing and automatic compression.

RemoteWare's AppliComms include versatile programs for creating and sending electronic forms, documents, reports, and E-mail by means of conventional or cellular modems.

RemoteWare Forms 1.3 provides a "master record" capability that automates the flow of information across an organization. You can create a training schedule, store it on your database server, and send copies to other RemoteWare users. Updates are sent automatically to all users.

RemoteWare Documents 1.2 now enables you to create detailed reports and documents that include graphics, images, and text. A built-in compression feature reduces modem transmission time.

RemoteWare Mail 1.3 now supports the X.400 protocol, so you can exchange messages with public E-mail providers such as MCI and AT&T.

RemoteWare's components are priced separately. Forms 1.3 is $7500, Documents 1.2 $2500, Reports 1.2 $1500, and Mail 1.3 $3000. Software for remote users ranges from $75 for Mail 1.3 to $225 for Forms 1.3.

—Jeff Bertolucci

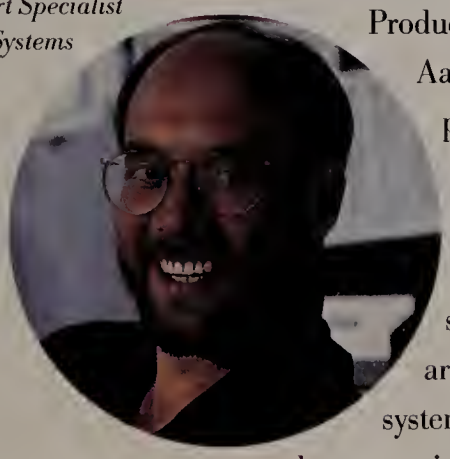
RemoteWare

This family of office automation products strengthens ties between headquarters and the branch office.

XcelleNet
800/322-3366,
404/804-8100,
404/804-8102 (fax)
List price: $1500 to $7500, $75 to $225 for remote users
Reader service no. 667

There was a time when your worst technical nightmare wouldn't go away till the morning after.

Aaron Matas
Product Support Specialist
IBM Personal Systems
HelpCenter



IBM Personal Systems HelpCenter® Product Support Specialist Aaron Matas knows from personal experience that emergencies don't keep bankers' hours. That's why our HelpCenter stays staffed and ready around the clock. So if a system goes down, you won't have to wait till sometime the next day to find out if it's your hardware, software, or who knows what. After all, it's just common sense that the company who sold you the system should be there for you when you need them. Whatever your question, experts like Aaron are wide awake and ready to help you get back in business. Fast. It's all part of IBM HelpWare®.

If you've ever bought computers "direct", we want you to know one important thing.

IBM PC Direct

We're putting the personal in personal computing.

This time, it can be different.

This time it's

L-R: Alice Robinson, Gregg McGhee, Jeff Herman and Beverly Whitman, Custom Build Technicians, IBM Personal Computer Company

425SX/S

ValuePoint SpaceSaver

- Compact size: 14.2" W x 4.8" H x 16.5" D
- 3 slots (includes 1 VESA Local Bus slot!) and 3 bays
- Also available in medialess (no drives) configuration to function as an economical LAN client workstation!

433DX/D

ValuePoint Desktop

- Plenty of room to grow: 5 slots (includes 1 VESA Local Bus slot!), 5 bays
- A super combination of speed, power, upgradability and expandability!

466DX2/T

ValuePoint Mini-Tower

- Convenient, compact Mini-Tower processor case measures 9.5" W x 16.8" H x 16.9" D
- Enormous room for growth: 8 slots (includes 1 VESA Local Bus slot!), 6 bays
- Perfect format for high powered computing (CAD/CAM, graphics, multimedia, etc.) or as a low-cost network server!

IBM PC Direct

We're putting the personal in personal computing.

IBM

If you don't see it here, call us. We'll custom build a system just for you.

It's a personal commitment from Alice, Gregg, Jeff, Beverly and their associates at the IBM Personal Computer Company. Thousands of IBM people – many working around the clock – to keep you personally delighted with everything we do for you.

It starts – but doesn't end with – our hot-selling IBM ValuePoint™ PCs. Take a closer look at the systems shown here. Super PCs. Super prices. But if you don't see the system you want, call us. We'll build your PCs to your specifications – and your budget.

Remember, ValuePoint is backed by IBM HelpWare, including our 30-day moneyback guarantee. No qualms. No quibbles. No questions asked.[1] And for 1 year with free around-the-clock telephone assistance and fast onsite service (even in the most remote locations!) from more than 10,000 IBM service representatives in over 1,600 locations nationwide.[2]

Call us today. And discover how we're putting the personal in personal computing.

intel inside

All ValuePoint systems feature:

- 101-key IBM Enhanced Keyboard and IBM Mouse
- Intel® i486™ processors
- SVGA VESA Local Bus Video
- A 32-bit VESA Local Bus slot for local bus speed on SCSI drives and other peripherals!
- IBM HelpWare
- Upgradability via Intel OverDrive™ technology all the way up to Pentium™ [3]
- Zero Insertion Force (ZIF) socket for fast, easy processor upgrades.

ValuePoint SpaceSaver	425SX/S	433SX/S	433DX/S	433DX/S
Processor	i486SX/25 MHz	i486SX/33 MHz	i486DX/33 MHz	i486DX/33 MHz
Hard Drive/Memory	120MB/4MB	120MB/4MB	120MB /4MB	245MB/8MB
Diskette	3.5"	3.5"	3.5"	3.5"
Display	6312 14" SVGA NI	6312 14" SVGA NI	6312 14" SVGA NI	6314 14" SVGA NI
Operating System	IBM DOS & WINDOWS™	IBM DOS & WINDOWS	IBM DOS & WINDOWS	OS/2®
Price* / IBM Credit Lease**	**$1,579** / $57 per month	**$1,779** / $64 per month	**$2,029** / $73 per month	**$2,469** / $89 per month

ValuePoint Desktop	425SX/D	433SX/D	433DX/D	466DX2/D
Processor	i486SX/25 MHz	i486SX/33 MHz	i486DX/33 MHz	i486DX2/66 MHz
Hard Drive/Memory	120MB/4MB	120MB /4MB	120MB/4MB	245MB/4MB
Diskette	3.5"	3.5"	3.5"	3.5"
Display	6312 14" SVGA NI	6312 14" SVGA NI	6312 14" SVGA NI	6312 14" SVGA NI
Operating System	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS
Price* / IBM Credit Lease**	**$1,659** / $60 per month	**$1,859** / $67 per month	**$2,099** / $76 per month	**$2,779** / $100 per month

ValuePoint Mini-Tower	433DX/T	466DX2/T	466DX2/T	466DX2/T
Processor	i486DX/33 MHz	i486DX2/66 MHz	i486DX2/66 MHz	i486DX2/66 MHz
Hard Drive/Memory	340MB/4MB	527MB/4MB	527MB/4MB	527MB/8MB
Diskette	3.5"	3.5" & 5.25"	3.5"	3.5"
Display	6318 14" SVGA NI	6318 14" SVGA NI	6319 15" SVGA FS NI	6319 15" SVGA FS NI
Operating System	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS	OS/2
Price* / IBM Credit Lease**	**$2,579** / $93 per month	**$3,499** / $126 per month	**$3,599** / $130 per month	**$3,789** / $137 per month

Call 1 800 IBM-2YOU

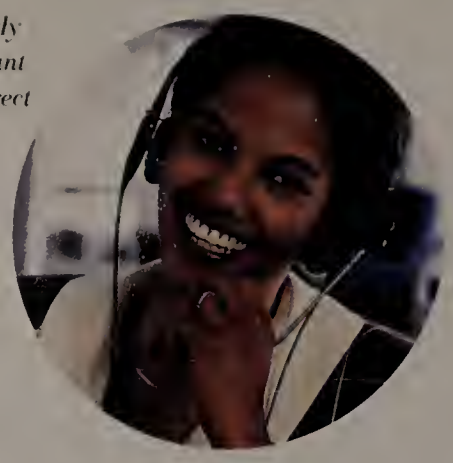
refer to: DCE

1 800 426-2968,
8am-midnight M-F, EDT;
8am-7pm Sat., EDT.

Purchase order is available for qualifying customers.

IBM®

Angela Hardy
PC Consultant
IBM PC Direct



It's as simple as calling Angela Hardy, or any one of our other PC consultants. ValuePoint PCs, ThinkPad® notebooks, peripherals, printers, displays, add-ons, the most popular software and more (IBM and non-IBM) are all yours – at prices you'll find personally pleasing – when you call 1 800 IBM-2YOU. You'll speak to a PC consultant who'll either answer any question you have, or get you in touch fast with an expert who can. If you don't see it here, it's in our free catalog. And if it's not in the catalog, we can probably get it for you anyway. Either way...call!

This time you can have it all.

Save space inside your multimedia PC!

The Mwave™ WindSurfer™ Communications Adapter is a V.32 Data Modem, 9600 bps Fax/Modem and CD-quality sound system. Mwave MIDI synthesizer with instruments *and* MIDI port...all in one!

Mwave WindSurfer Communications Adapter (92F4057) $349

Eliminate LAN processing bottlenecks!

The IBM LAN Streamer MC 32 Adapter can help you increase your network's capacity and set new standards for speed and performance! No new hardware or costly facility rewiring. Streams frames directly between system memory and Token-Ring without storing them directly in adapter.

LAN Streamer MC 32 Adapter (92F8942) $859

Give your PC gigantic storage capacity!

This 3.5" Rewritable Optical Drive lets you put all your large-project files on one 127MB optical disk. You can store this disk in your desk, and free up precious hard drive space! Update data when you want, use the disk over and over.

IBM Enhanced 3.5" Rewritable Optical Drive (6451295) $1,499
SCSI External Enclosure (35I00V0) $219

The easy, affordable way to go to a speedy CD-ROM.

The ISA Internal CD-ROM has a fast 300KB/SEC maximum data transfer rate – double the speed of most CD-ROM drives! You can load your operating system and applications software from a typical 600MB CD-ROM disk. You save precious hard drive space and load onto your ISA system faster. It's priced to move fast too!

IBM ISA Internal CD-ROM Drive (32G2961) $315

Upgrade to 256KB L2 Write Back Cache Memory.

Here's a super way to boost system performance without buying a new system. This 256KB L2 Write Back Cache Memory Kit gives you an easy, standardized growth path for your ValuePoint systems

256KB L2 Cache Write Back Memory Kit (60G1626) $249
Cache Memory Kit 256KB (60G1625) $229
Cache Memory Kit 128KB (60G1624) $119
IBM Video Memory Upgrade Kit (60G1623) $89

Super Prices on popular software!

IBM PC Direct has the popular software you want, at prices you'll love. Remember, if you don't see it here, or in our catalogs, call us. Chances are we can get it for you fast!

WinFax™ Pro (MM13632) $79
STACKER® (MM29205) . . $95
Quicken™ for Windows 2.0 (MM45870) $45
WordPerfect® for Windows 5.2
3.5" (MM77919) $279
5.25" (MM80915) $279

FREE!

The IBM PC Direct™ Source Book. ValuePoint, ThinkPad, peripherals, add-ons, popular software ... it's all here and it's all yours for the asking. Call 1 800 IBM-2YOU today!

* IBM prices only. The offerings, prices and products are subject to change or withdrawal without prior notice. Products you acquire may not be counted under any existing Volume Purchase Agreement. The same offerings and products may be available through IBM Authorized Remarketers. Remarketer prices may vary. Shipping and handling charges are extra. **IBM Credit Lease prices are quoted for 36-month terms. Lease rates quoted are good through 9/30/93 after which time rates are subject to change without notice. Lease available to qualified commercial customers only. 1 Copies of warranty and 30-day moneyback guarantee information available through IBM and IBM Authorized Dealers. Please call 1 800 426-2968 for details regarding IBM's moneyback guarantee and limited warranty. 2 At no additional charge during warranty period. Onsite service available Monday-Friday 8am-5pm in your time zone. APPLIES TO IBM DIRECT SALES ONLY. 3 Upgradable with Intel's future OverDrive processor based on Pentium technology. IBM, HelpCenter, HelpWare, ThinkPad and OS/2 are registered trademarks and ValuePoint, Mwave and WindSurfer are trademarks of International Business Machines Corporation. Intel and Intel Inside logo are registered trademarks and i486, Pentium and OverDrive are trademarks of Intel Corporation. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation. PC Direct is a trademark of Ziff Communications Company and is used by IBM under license. STACKER is a registered trademark of STAC Electronics, Inc. WordPerfect is a registered trademark of WordPerfect Corporation. Quicken is a trademark of Intuit Corporation. WinFax is a trademark of Delrina Technology, Inc. ©1993 International Business Machines Corporation.

Call 1 800 IBM-2YOU
refer to: DCE
1 800 426-2968,
8am-midnight M-F, EDT;
8am-7pm Sat., EDT.
Purchase order is available for qualifying customers.

IBM PC Direct

We're putting the personal in personal computing.

@ SUM (LOTUS + PCWORLD) = TOP VALUE

Yes, please enter my subscription to the special PC WORLD Lotus Edition and bill me at the special rate of only $19.97 for 12 monthly issues - 58% off the newsstand rate. Just $1.67 per issue!

NAME

COMPANY

ADDRESS

CITY, STATE, ZIP

PC WORLD
LOTUS EDITION

MAIL THIS CARD OR CALL 800-825-7595 X501 • FAX: 415-882-0936

Please allow 6 to 8 weeks for delivery of your first issue. Offer good in the U.S. only. Basic subscription rate is $29.90
Savings based on newsstand price of $47.70

42CX4

Recycled Paper

SAVINGS CERTIFICATE

☐ YES! Please enter my subscription to the special **PC WORLD LOTUS EDITION** and bill me at the special charter rate of only $19.97 for 12 monthly issues—58% off the annual newsstand rate. Just $1.67 an issue!

Mail this card or call 800–825–7595 x 501 • Fax: 415–882–0936

Name_____

Company_____

Address_____

City, State, Zip_____

Please allow 6 to 8 weeks for delivery of your first issue. Offer good only in the U.S.

PC WORLD
LOTUS EDITION

42CW6

SUPER SAVINGS!

Recycled Paper

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

LOTUS EDITION

Subscription Department
P.O. Box 55011
Boulder, CO 80321-5011

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World Lotus Edition
Subscription Department
P.O. Box 55011
Boulder, Colorado 80321-5011

KingCOM Squashes Communications Port Conflicts

If you think having to close one program before opening another is a dull chore that disappeared with the advent of Windows, try launching several Windows communications packages at once. Begin opening Procomm Plus for Windows, for example, when Winfax Pro is open, and you're rudely confronted by a 'COM port busy' message, forcing you to close the fax program before proceeding. Want to receive a fax in the background? You have to close the comm program before relaunching the fax program.

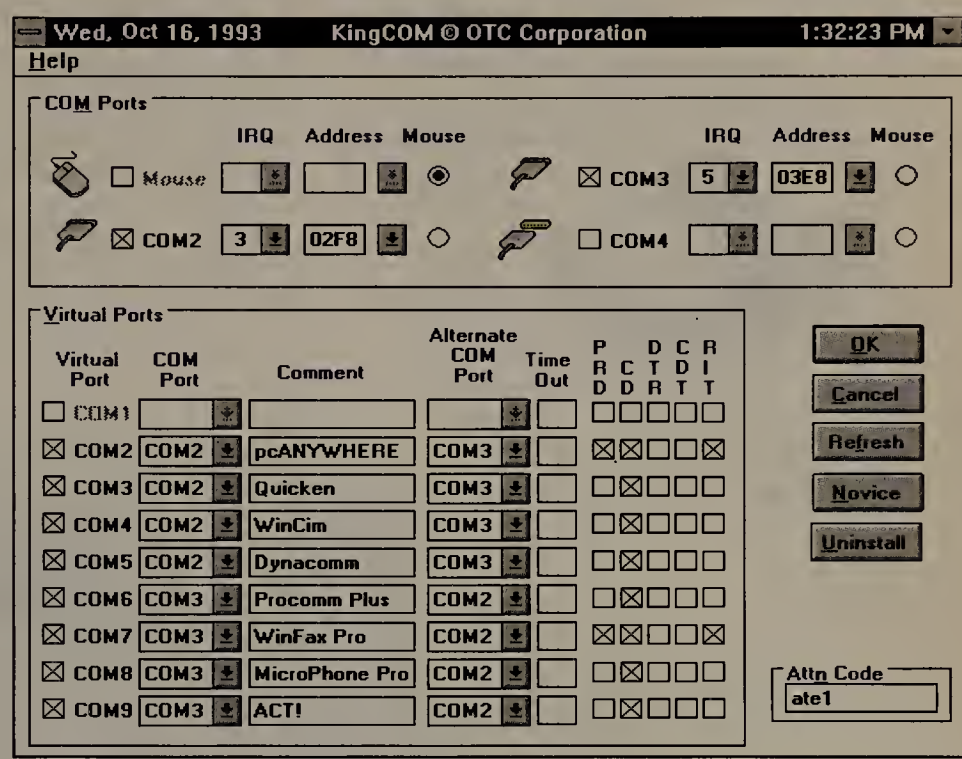
You're put through this rigmarole thanks to the fact that most applications that use the modem—such as E-mail, faxes, pager messaging, and auto-dialing programs—vie for total control of the COM port, which is the computer's gateway to your modem.

Enter KingCOM. This utility allows different communications programs to cohabit your Windows desktop by creating nine "virtual" ports. This neat software sleight of hand lets nine Windows-based comm programs stay open without conflicts. Say your external fax-modem is connected on COM1, and you want to keep both your data and fax programs open. You can "correct" the actual COM1 port to virtual ports 2 and 3, and then change the fax program setting to COM2 and the data program setting to COM3. KingCOM automatically hands over the real port to whichever communications program you switch to. (You can't send faxes and E-mail at the same time over virtual ports that are linked to the same real port.)

KingCOM lets you tailor the way your comm programs control the modem or modems. You can pick which application will answer incoming calls on the modem. If you use more than one modem, you can choose the first- and second-choice modems for each communications program.

OTC says the next version of KingCOM, which will support DOS communications programs, will be available by the time you read this.

—Bryan Hastings



KINGCOM LETS YOU RUN nine Windows-based communications programs at once without COM port conflicts.

KingCOM

WINDOWS Utility that allows multiple open communications programs in Windows.

OTC Corp.
800/769-6344,
714/832-4833
List price: $49.95
Reader service no. 668

Easy Connections: Printing Without Wires

Do you work at more than one PC? Take your notebook to meetings? Repeatedly connecting to your printer may be impractical. One solution is GoPrint, a wireless printer adapter from AeroComm.

GoPrint uses spread spectrum radio to transmit data from your PC or LAN to a printer within a 500- to 1000-foot radius, AeroComm officials say.

Featuring the company's proprietary data compression, GoPrint transmits data at up to 3 mbps, making it slower than wired Ethernet (which operates at speeds up to 10 mbps) but significantly faster than some wireless LAN products (for instance, Proxim's RangeLAN runs at only 242 kbps).

You plug the GoPrint adapter into the parallel port of your PC and another GoPrint into the printer's parallel port. Each GoPrint adapter is configured to print to a specific printer. A bundled utility enables your PC to switch from one GoPrint-equipped printer to another. Also, several GoPrint-equipped PCs can print to the same printer—useful for work groups.

An optional GoPrint print buffer with 1MB of RAM stores printer-bound data, freeing your PC for other tasks. GoPrint has a DOS and Windows utility that tests the radio signal strength between your PC and printer. GoPrint uses the high-performance 2400-MHz band, which offers greater performance than the narrower 902-MHz to 928-MHz band used by many wireless LAN adapters.

GoPrint will be priced under $249, according to AeroComm. The device is powered by an AC adapter or by a connector that draws power from your PC's keyboard port.

—Jeff Bertolucci

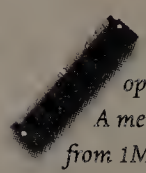
GoPrint

A wireless adapter that transmits data from your PC to your printer.

AeroComm Inc.
913/492-2320,
913/492-1243 (fax)
List price: Under $249
Reader service no. 669

The HP 4L isn't bad, but

THE HP 4L

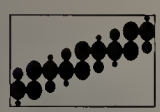


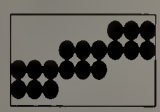
There's only one option on the HP 4L. A memory upgrade from 1MB to 2MB.

The HP 4L is a good laser printer. Just limited.

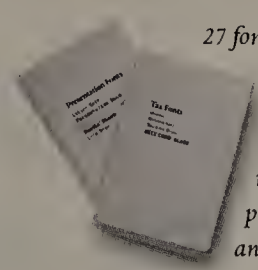
ALL COMPANY AND/OR PRODUCT NAMES ARE TRADEMARKS AND/OR REGISTERED TRADEMARKS OF THEIR RESPECTIVE MANUFACTURERS, INCLUDING HP WHICH IS REGISTERED BY HEWLETT PACKARD CO. EPSON DISCLAIMS ANY AND ALL RIGHTS IN THOSE MARKS. EPSON IS A REGISTERE

it's no ActionLaser 1500.


with RITech

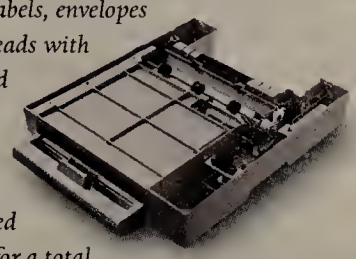

without RITech

Epson's RITech (Resolution Improvement Technology) increases the ActionLaser's normal 300 dpi print quality to eliminate jagged edges right where you need it: in the curved lines of letters, numbers and images. And Epson's MicroArt printing technology gives you deep, dark blacks and incredibly fine lines.



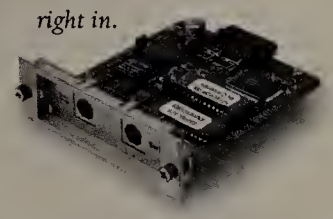
27 fonts (13 scalable) are standard. Should you expand your typographical horizons, unlimited fonts are easy to install via HP-compatible plug-in cartridges, available anywhere. The HP 4L doesn't accept HP's cartridges.

The ActionLaser has 150 sheet paper capacity (letter or legal), and handles stacks of labels, envelopes and overheads with ease. And there's an optional 250 sheet auto-feed cassette, for a total of 400 sheets. The HP 4L holds 100 sheets. Envelopes, labels and overheads are manually fed, one at a time.

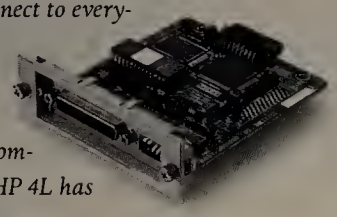


The ActionLaser 1500's top speed is six ppm. That's seriously fast, fifty percent faster than the HP 4L.

If you have a DOS machine, but decide to get a Macintosh, do you need a new printer? Not with an ActionLaser 1500. Just add our EpsonTalk interface and your Mac plugs right in.

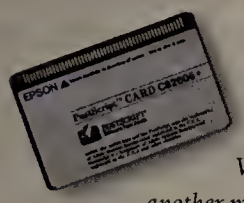


The ActionLaser 1500 comes standard with parallel and serial interfaces that allow two users to share a single printer. Add another interface and a third user can share the same printer. The ActionLaser 1500 can connect to everything from PCs to IBM mini and mainframe computers. The HP 4L has one interface.



THE EPSON ACTIONLASER 1500

It's easy to add more memory. Just pop in inexpensive, industry standard DRAM chips, for a maximum of 5 MB. The HP 4L only goes up to 2 MB.



PCL 5 is standard. The extra power of Adobe PostScript is a simple plug-in option. With HP, you have to buy another printer to get PostScript.

PC Computing Best Buy. (June 1993.) The word is getting around. The Epson ActionLaser 1500 is the best choice in personal lasers.

The ActionLaser 1500 comes with Epson's limited two year warranty. HP offers one year. For help, call the Epson Connection. Quite possibly the best help line in the business. And it's free.

THE EPSON CONNECTION

Don't buy a laser with a limited future. Buy one that is able to expand for the future. Compare, and you'll see why the speedy, inexpensive ActionLaser™ 1500 is the one laser worth owning. For information on the Epson ActionLaser 1500, our ink jet and dot matrix printers, or scanners, call the Epson Connection℠ at **1-800-BUY-EPSON** (800-289-3776).

EPSON®

DEMARK OF SEIKO EPSON CORP. ©1993 EPSON AMERICA, INC., 20770 MADRONA AVE., TORRANCE, CA 90503. FOR DEALER REFERRAL OR WARRANTY DETAILS, CALL 800-BUY-EPSON (800-289-3776). IN CANADA, CALL (800)GO-EPSON. FOR LATIN AMERICA, 305-265-0092

Edited by Jeff Bertolucci

FlagShip 5.0

DacEasy, long known for its feature-rich, low-end accounting software, is now tackling the high-end market with FlagShip 5.0, a customizable multimodule accounting system for large companies. FlagShip 5.0 supports multicurrency transactions, includes user-customizable menus and help screens, and keeps up to 36 months of transaction history in the general ledger, accounts payable, and accounts receivable modules. The developer's kit includes a 4GL programming language and tools for writing custom and vertical-market applications. FlagShip's single-user System Manager and all accounting modules sell for $695 each. The multiuser System Manager sells for $995. DacEasy Inc., 800/222-8778, 214/248-0305.

Reader service no. 670

Microsoft Scenes

Microsoft Scenes is a line of photographic collections intended to make your screen more visually pleasing. Each of the three collections, Sierra Club, Outer Space, and Impressionists, comes with 48 compressed high-resolution images and software to display pictures as wallpaper or screen savers. You select pictures from thumbnail displays and can choose a particular image or cycle through several images. Each image comes with explanatory text that you can pop up if you're in the mood to be educated. Scenes has its own screen-saver engine—or you can display the pictures with Berkeley Systems' After Dark. Genigraphics also provides a service for scanning pictures into the Scenes format, and three free scans come with the program. Because of the compression used, one Scenes package will take only about 3MB of hard disk space. And yes, the Sierra Club does get a cut. Each collection lists for $29.95. Microsoft, 800/426-9400, 206/882-8080.

Reader service no. 671

STB Pegasus VL Accelerator Board

STB takes the high road to faster video with its Pegasus VL line of Windows accelerator boards for ISA, VL, and PCI systems. Based on S3's top-of-the-line 928 graphics processor, the Pegasus uses fast VRAM and comes in 2MB and 4MB configurations. The 2MB version displays resolutions up to 1280 by 1024, with 256 colors, at a flicker-free 74-Hz screen refresh rate. It displays over 16 million colors at 640 by 480 resolution, with a 72-Hz refresh rate. The 4MB model shows over 16 million colors at 1024 by 768, while maintaining a high 80-Hz refresh rate. Maximum resolution is 1600 by 1200 with 256 colors, but the refresh rate dips to 60 Hz. All 2MB versions list for $799; the 4MB models are $999. STB, 214/234-8750, 214/234-1306 (fax).

Reader service no. 672

MICROSOFT SCENES screen collections include Sierra Club (above), Outer Space, and Impressionists. Each has 48 high-resolution images.

MapLand

Quattro Pro for Windows users can now display their data on maps with MapLand, an add-in module that lets you display data on a collection of U.S. and world maps. You can choose from shaded or pin maps and display any portion of a map that geographically corresponds to your data. All of Quattro Pro's editing features work with MapLand, the company says. You can use MapLand to insert country or state names into your spreadsheet, too. MapLand looks for U.S. state names or country names in your spreadsheet and matches them to the location on the map, along with the values you have assigned. MapLand lists for $99.95. Software Illustrated, 510/463-9898 or 510/463-1843 (fax).

Reader service no. 673

Great Plains Accounting Version 7

Faster record retrieval and updating as well as user-customizable help top the list of new features in version 7.0 of Great Plains Accounting. In all, more than 100 new features have been added across all modules of the program. Upgrade pricing varies, depending on which support plan you choose. Version 7 modules cost $195 to $1295. Great Plains Software, 800/ 456-0025.

Reader service no. 674

Cardex V41LBV

CardExpert Technology, a Silicon Valley startup, is now delivering low-cost graphics acceleration with its Cardex V41LBV board for VESA local bus systems. The Cardex V41LBV comes with 1MB of DRAM and displays up to 16.8 million colors at VGA (640 by 480) resolution. It offers a flicker-free 72-Hz screen refresh rate. The board also features a maximum resolution of 1024 by 768 in 256 colors, with a 72-Hz refresh rate. Based on Tseng Labs' ET4000/W32 chip, the Cardex V41LBV merits serious consideration from DOS users, because the W32 chip is expected to perform quite well with DOS applications compared to other popular accelerator chips. The Cardex V41LBV retails for $195. CardExpert Technology, 408/748-1118.

Reader service no. 675

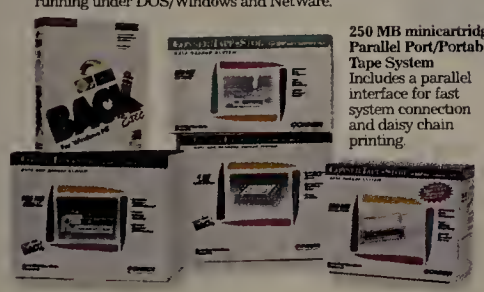
Masterclips

Want to spruce up that business letter or presentation with some snazzy clip art? Masterclips is a 6000-piece clip art package with color images in 60 different groups, including such business-oriented categories as technology, office, and communica-

"So I'm waiting for my best friend to call and Dad's like totally freaked. No one at his office wanted to mess with one of those storage things. You know, the tape deals.

Well, Dad said these guys at Conner told him it's so simple a kid could do it. So I did. Dad got a promotion, I got my own phone, and they even gave me a fax thing. Hey Mom, what's a fax?"

Conner Backup Software
Backup software for Conner and other tape systems running under DOS/Windows and NetWare.



250 MB minicartridge Parallel Port/Portable Tape System
Includes a parallel interface for fast system connection and daisy chain printing.

250 MB, 525 MB or 1.3 GB cartridge Internal Tape System
Provide greater capacity and speed and include Conner Backup Exec™ Software.

2 GB or 4 GB DAT Internal Tape System
Include Conner Backup Exec software for DOS, Windows and NetWare.

250 MB minicartridge Internal Tape System
Uses the PC's existing floppy controller and features easy-to-use, Simply Safe backup software.

CONNER®
The Storage Answer
Maynard is now Conner.

Call 1-800-755-0535 for the Conner dealer nearest you.

All trademarks or registered trademarks are of their respective owners © 1993 Conner Peripherals, Inc.

Circle 49 on reader service card

tions. All images are in CGM format and can be imported into many major DOS and Windows programs, including Word for Windows, Harvard Graphics, and CorelDraw. The package, available on floppy disk and CD ROM, includes an image browser for easy image management. You can also convert color images to black and white. It lists for $299 from Masterclips Inc., 800/292-2547, 305/983-7440, 305/967-9452 (fax).

Reader service no. 625

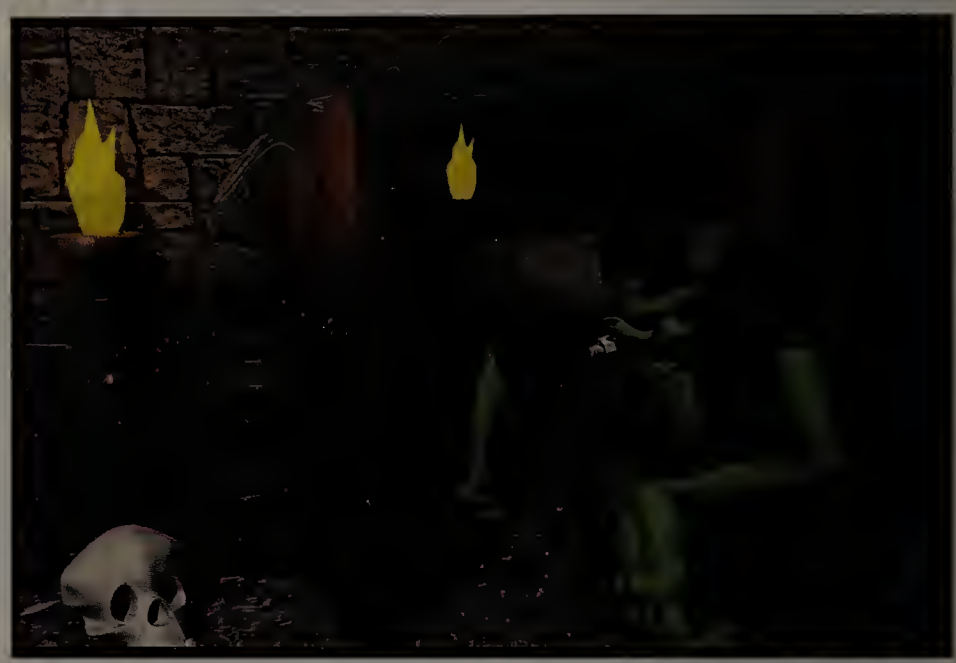
WorldCom V.32bis Modem

Combining high-speed fax and data with cellular capabilities, the WorldCom V.32bis fax-modem packs a powerful set of communications tools into a lightweight, pocket-size package that keeps you in touch when you're on the go. Among the first modems to feature Motorola's 68302 processor for additional data compression, the WorldCom V.32bis offers an uncompressed data rate of 14,400 bps; with built-in V.42 compression, the product's top speed is 57,600 bps. It supports cellular transmission, useful for wirelessly transmitting files when a land line isn't available. Measuring 4¾ inches long, 2⅜ inches wide, and about 1 inch thick, the WorldCom V.32bis is truly portable. It includes an AC power adapter and will also run on a 9-volt battery. The WorldCom V.32bis costs $695. Western Digicom, 800/262-3311.

Reader service no. 639

OL830 Plus, OL850

Okidata adds two models, the OL830 Plus and the OL850, to its line of LED (light-emitting diode) page printers. Unlike most page printers on the market, these printers use an array of LEDs instead of a single laser to discharge the photosensitive drum, which applies toner to the page. Both are 8-page-per-minute, 300-dot-per-inch printers equipped with Adobe



CREATE YOUR OWN 3-D MONSTER with Playmation's animation program. The program ships with a library of characters.

IN MAY, THIS WAS THEIR LATEST TWIST IN MICE.

MORE OF EVERYTHING, EXCEPT A CORD.
When Logitech set out to design the world's most advanced mouse, we listened to the 60% of you that wanted one without a cord*. So while Microsoft was busy finding a "more flexible cable" for their new mouse, we were getting rid of ours completely.

MORE COMFORTABLE OUTSIDE.
We continued the ergonomic evolution of the 25 million mice we made before this one, and shaped MouseMan Cordless to fit naturally in your palm and leave your wrist relaxed. Then we added grooves to our three keys that help your fingers find them easily.

PostScript; both come with Adobe Type Manager. The OL830Plus (which replaces Okidata's OL830) includes 17 scalable Adobe Type 1 fonts. The OL850 (which replaces the OL840) has 65 fonts (35 resident, plus 30 downloadable soft fonts). The OL830 Plus lists for $1799, the OL850 for $1999. Okidata, 800/654-3282.

Reader service no. 677

Playmation

3-D computer animation is a realm reserved for people with access to high-end systems, expensive software, and lots of time, right? Not anymore. Playmation is a 3-D animation program for the average user. You can create 3-D characters, choreograph their actions, animate them, render them, and show your completed animations on any 386 or better PC (a math coprocessor is required). The program ships with a library of dozens of characters for use in animations, so even if you can't draw a line you can create animations right away. To create a character, you build a few key frames and let the computer build the necessary in-between frames. You can apply surface textures, control lighting, direct the action of your characters, and control complex muscle and skeletal movements. Playmation sells for $559.95. Hash Enterprises, 708/234-8060, 708/234-8031 (fax).

Reader service no. 678

Printex Paper Server

It's Murphy's Law: The paper supply always runs out just before you need to print something in a hurry. To boost your printer's paper capacity, consider Printex Technology's Paper Server. This oversize paper feeder holds 1500 sheets, enough to supply workhorse printers that are connected to networks. The Paper Server for Canon SX- and RX-based printers costs $495; pricing for the Canon NX model wasn't available at press time. Printex Technology, 415/591-8007, 415/591-8928 (fax).

Reader service no. 637

City Streets: The Electronic Street Guide

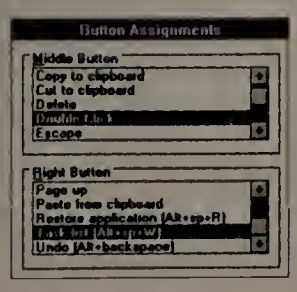
City Streets is a DOS navigation application that lets you put the places you frequent on your own digital map. You can add your clients' offices, your favorite restaurants, or anyplace you repeatedly visit to City Streets maps. Use the program to search for your destination by address, street, intersection, city, or ZIP code. It quickly locates it and displays the distance you'll need to travel. City Streets information is based on maps and data from reputable digital mapmaker Etak. However, City Streets maps lack one-way street information and can't suggest a route to your destination. The product lists for $99.95 and includes one free city map. Additional maps cost $49.95 each. Road Scholar, 713/266-7623, 713/266-4525 (fax).

Reader service no. 638

For more information about any product, contact the manufacturer or circle the number on the reader service card. ■

NOW IT'S AUGUST.

INTRODUCING MOUSEMAN® CORDLESS FROM LOGITECH.



MORE POWERFUL INSIDE. Combined with our unique software, those keys cut down on repetitive motions by reducing tasks to a mere mouse-click. You can, for example, 'cut' and 'paste' 27% faster in WordPerfect™,† call up task lists, or double click by pressing a button.

FREE 60-DAY TRIAL OFFER, DIRECT FROM LOGITECH. We're so confident you'll love our new mouse, we want you to try it for free. Use MouseMan Cordless for 60 days, and if you're fully satisfied, we'll bill you $99 (shipping and handling included).** If not, simply return it, no questions asked. To order, call **1-800-732-3127.** 90

LOGITECH

The Senseware™ Company

*From unaided responses in a large survey of computer users. †Based on independent test results. Detailed results available upon request.
**CA and MA residents must pay sales tax. Offer expires October 15, 1993. Allow 2–3 weeks for fulfillment. ™/® Trademarks belong to their registered owners.

Circle 122 on reader service card

Marketplace

A Monthly Survey of Prices on Popular Models

Over the Counter

What you pay for popular PCs (with monitors)

n/a = not applicable

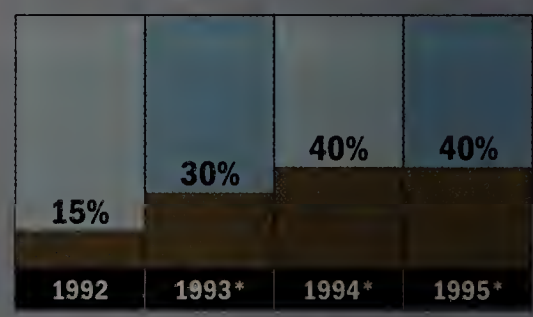
	Configuration			National	
	CPU/speed (MHz)	RAM (MB)	Hard disk (MB)	List price	Average street price
386-class desktop PCs					
ALR Flyer SC 3/33s	i386SX-33	2	170	$1268	$1142
AST Bravo 3/33s	AMD386SX-33	4	120	$1495	$1344
Dell Dimension 386DX/33	i386DX-33	4	212	$1449	$1449
DECpc 333sx LP	i386SX-33	4	52	$1399	$1399
HP Vectra 386/33N	i386SX-33	4	80	$1898	$1692
486SX-class desktop PCs					
ALR Flyer SC 4/33s	i486SX-33	2	240	$1568	$1399
AST Bravo 4/33s	i486SX-33	8	213	$2360	$2150
Compaq ProLinea 4/25s	i486SX-25	4	240	[1]	$1711
CompuAdd 433S	i486SX-33	4	200	$2285	$2285
Epson America Progression 486SX/25	i486SX-25	4	240	$2538	$2188
HP Vectra 486/25N	i486SX-25	4	170	$2338	$2045
Gateway 2000 4SX-33	i486SX-33	4	170	$1495	$1495
IBM PS/2 Model 85 XP 486[2]	i486SX-33	8	212	$4739	$4285
NEC Image 425	i486SX-25	4	170	$2319	$2126
ZDS Z-Station 433Sh	i486SX-33	4	200	$2009	$2009
486DX-class desktop PCs					
AST Bravo 4/66d	i486DX2-66	8	210	$2660	$2444
Compaq ProLinea 4/33	i486DX-33	4	340	[1]	$2264
CompuAdd 466	i486DX2-66	8	340	$2995	$2995
DECpc 466d2 LP	i486DX2-66	8	245	$2949	$2949
Dell 466/M	i486DX2-66	8	320	$3249	$3249
Gateway 2000 4DX2-66V	i486DX2-66	8	340	$2495	$2495
HP Vectra 486/66U PC	i486DX2-66	4	240	$4358	$3622
IBM PS/ValuePoint 433DX	i486DX-33	4	120	$2169	$2169
Insight 486DX2-66	i486DX2-66	4	250	$2099	$2099
NEC Image 466	i486DX2-66	4	340	$3074	$3097
Zeos 486DX-33	i486DX-33	8	245	$2095	$2095
Portable PCs					
AST PowerExec 3/25SL	i386SL-25	4	60	$2099	$1943
Compaq Contura 3/25	i386SL-25	4	120	[1]	$1540
Compudyne 486DX2/66 Slimnotebook	i386DX2-66	4	210	$2999	$2999
Dell 320SLi	i386SL-20	2	80	$1699	$1699
Epson ActionNote 4SLC/25	i486SLC-25	4	120	$1619	$1619
Gateway 2000 Nomad 450DXL	i486DX2-50	8	200	$2995	$2995
HP 95LX	NEC V20-5	1	n/a	$799	$614
HP OmniBook 300	Am386SXLV-25	2	40	$1950	$1950
IBM ThinkPad 700	IBM486SLC-25	4	80	$2750	$2598
NEC UltraLite SL/20	i386SL-20	2	80	$1499	$1258
NEC UltraLite Versa	i486SL-25	4	120	$4269	$3808
TI TravelMate 4000WinDX	i486DX-25	4	120	$2799	$2486
Toshiba T4400C	i486SX-25	4	120	$3999	$3643
ZDS Z-Note 325Lc	i386SL-25	4	120	$3335	$3335

From a national survey of more than 180 dealers by International Data Corporation. Figures are based on at least four price quotes for each machine. Prices are based on manufacturer's standard configuration with monitor.

[1] No list price available. [2] Uses MCA bus.

Software Suite Sales Rising

Microsoft, Lotus, and Borland suite sales as a percentage of their overall unit sales



The way America buys software is changing. Microsoft, Lotus, and Borland, the big three players in the software suite market, are selling more of their mainstay applications through suites, says Jeff Silverstein, publisher of the *Software Industry Bulletin*. The suites are selling particularly well to first-time buyers, who want an inexpensive way to stock their PCs, he says. By 1995, he expects suite sales to stabilize at 40 percent of overall sales.

**Projected* *Source:* Software Industry Bulletin

Suites Offer Real Savings

Suites vs. individual applications: July street prices

$359 Borland Office

$571 Purchased individually
Quattro Pro for Windows 1.0, $141; WordPerfect for Windows 5.2, $270; Paradox for Windows 1.0, $160

$442 Lotus Smart Suite 1.2

$1270 Purchased individually
1-2-3 for Windows 1.1, $315; Ami Pro 3.0, $243; Freelance Graphics 2.0, $315; cc:Mail 1.0 (per user in a ten-user pack), $300; Lotus Organizer 1.0, $97

$470 Microsoft Office for Windows 3.0

$1146 Purchased individually
Excel for Windows 4.0, $283; Word for Windows 2.0, $292; PowerPoint 3.0, $309; MS Mail 3.0 (per user in a five-user pack), $262

The current crop of software suites offers great deals for consumers, and more good news lies ahead, says industry analyst Will Fastie. With the upcoming addition of database applications to Lotus and Microsoft suites, price competition will heat up, Fastie predicts. After that, it's unclear how many more applications will be added to a suite—vendors may combine different applications into suites targeting different users, he says.

Source: International Data Corp.

LOTUS

GET THE MOST FROM 1-2-3 & THE LOTUS APPLICATION SUITE

A New Database Approach

Six years after Lotus began flirting publicly with user-friendly databases, it's finally offering software you can buy. The newly acquired Approach aims to give you relational database power in a comfortable graphical database manager that doesn't require programming. This is no small trick, and Approach pulls it off well enough to cop a Best Buy in *PC World*'s June review of Windows databases.

While Approach gives Lotus an entry into a small but quickly growing Windows database market, Lotus really bought it to fill out the SmartSuite—answering Microsoft's Access and Borland's Paradox with a database that is far more accessible for anyone who doesn't really want to become a programmer. Of course, SmartSuite 2.0 already includes a menu-driven database manager with good hooks to external data (within 1-2-3 release 4.0), and most spreadsheet users will probably stick with that.

Eric Bender, Executive Editor

Editors Choice: Top Add-Ons for 1-2-3

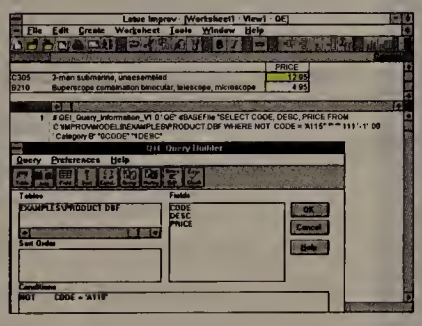
L4 Add-on packages let you speed your work, customize 1-2-3 for your needs, enhance the appearance of your worksheets, and apply "precooked" solutions to specific business problems. Here's the pick of the crop.

Financial Formulas That Lotus Forgot

L13 When 1-2-3 strikes out on three common loan calculations, these models step up to the plate.

Turn Your Worksheet Into a Team Player

L18 Release 4.0's Version Manager makes it dramatically easier to do what-if planning with your co-workers—within a single worksheet. Here's how.



News

L2 Improv is a smash hit, but users say the radical new spreadsheet is a specialized tool that works alongside conventional spreadsheets rather than replacing them. And Lotus plans an upgrade of 1-2-3 3.*x* for DOS that adds worksheet tabs, a live status bar, and version management features without losing compatibility.

Improving Your Skills
L22 Spreadsheet Auditing Made Easy

1-2-3 Tips
L24 Getting Started With Release 4.0 Databases

Macro Basics
L29 Stop Bugs in Their Tracks

Advanced Macros
L31 Create Your Own "Add-Ins"

Q&A
L34 Suppress Zeros, Extract From a Multisheet File

Suite Success
L37 Full-Text Searching in Notes 3.0

Improvisation
L38 Break Your 1-2-3 Habits

Instant Reference Card
277 1-2-3 release 4.0

See page L16 for information about ordering Models on Disk, which includes models and other files from these articles.

Lotus News

NEWS YOU CAN USE ABOUT THE LOTUS APPLICATION SUITE

Improv Finds Its Niche

With 200,000 copies shipped in its first few months, Improv has firmly established itself on the spreadsheet landscape and sent rival spreadsheet designers back to the drawing boards. But even its staunchest fans say that Improv will live alongside conventional spreadsheets rather than make them obsolete.

"It won't replace a traditional spreadsheet," declares Jim Alsup, assistant to the president of Hunt Oil in Dallas, who sets information systems policy for Hunt. Traditional spreadsheet work—what Alsup calls "repetitive modeling"—is more than half of what his users do, so even those who load Improv will keep 1-2-3 installed.

Spreadsheet veterans "will be flabbergasted at what can be done with Improv," notes Fred Zickert, manager of microcomputer support for Eaton Corporation, a Cleveland manufacturer. "Improv really has no limits." But he agrees with Alsup that users won't abandon their previous spreadsheet.

"IMPROV REALLY HAS NO LIMITS," says Fred Zickert, but users should plan to build models from scratch rather than convert worksheets.

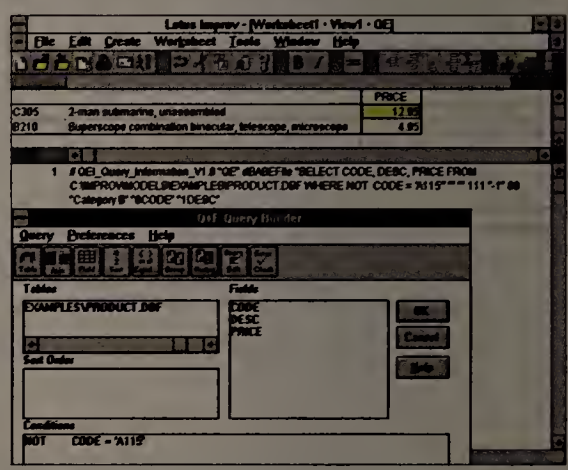
Novices May Learn More Quickly

One barrier to Improv's acceptance is what Zickert calls "cultural baggage"—the understandable wish to stick with the painfully acquired knowledge of your familiar package. It's hard to abandon your habits, and that often makes moving to Improv easier for novices than for veterans. "I shipped a copy to an unsophisticated user, and he absolutely loves it," Alsup says.

Another problem is the difficulty of moving applications to Improv, which differs so fundamentally from 1-2-3 that it can't convert and run 1-2-3 macros. You wouldn't want to move your existing models anyway, says Zickert. "Instead, you should develop a new model, and take advantage of Improv's features." But that's no trivial amount of work.

This sidekick role is no surprise to Lotus. "We all have conventional ovens, but when we got a microwave, we didn't throw them out," points out Improv group product manager Jeffrey Anderholm.

The new program's strengths are different from conventional spreadsheets', particularly its capability to manipulate large sets of data or handle very complex relationships, comments Jeffrey Tarter, publisher of *Soft-letter* in Watertown, Massachusetts. "The funny thing is, an amazing number of people seem to be using Improv to build traditional spreadsheet applications.



IMPROV 2.1 BUNDLES THE Q+E DATA ACCESS TOOL and adds smoother network support.

"Some of the Improv features will start showing up in other products. Improv is a precursor to a whole generation of mainstream spreadsheets."

Upcoming versions of Excel and Quattro Pro for Windows, expected this fall, reportedly will add a utility to pivot rows and columns to display different views of a model. Unlike Improv, these programs remove the data from the worksheet, separate it from its formulas, then manipulate it—so you must return to the worksheet to change data or formulas, or create graphs. Neither company appears to be working on general (rather than cell-specific) English language formulas, a key Improv advantage.

Improv lacks much of the polish in 1-2-3 release 4.0 for Windows, such as a full complement of charts, integrated access to external data, and version management. An upgrade scheduled for July should address some limitations with improved network support and a starter edition of the Q+E data access tool. **—Douglas Barney**

Douglas Barney is a senior editor for InfoWorld *in Boston.*

PHOTO: BRUCE ZAKE

Lotus Plans 1-2-3 for DOS Upgrade

Lotus has begun work on a major upgrade to the 1-2-3 3.*x* for DOS product line. The new release will retain the Classic menu and compatibility with existing worksheets, file formats, and macro code. It has not been given a firm title (although it's likely to be called release 4 for DOS), and Lotus has not set a ship date.

Among user-interface enhancements, the new version will include worksheet tabs such as those in 1-2-3 release 4.0 for Windows, which give you one-click access to each sheet in a multisheet model. Other goals include adding more SmartIcons and a live status bar—like those in Lotus's Windows suite—at the bottom of the screen to make it easier to apply formatting and styles.

A new menu item, Tools, will include new features such as a spelling checker and E-mail plus a few existing features that weren't on the menus, such as commands for attaching add-ins.

The planned upgrade also will let you create, annotate, and track several versions of a worksheet, although it may not provide the full functionality of 1-2-3 4.0's Version Manager.

And new @functions will let you calculate subtotals and grand totals, find the day of the week for a given date, calculate the number of working days between two dates, find the principal portion of a loan payment, and determine the weighted average of a series of numbers.

Lotus will continue to invest far more development and marketing effort in its Windows line. The supplier does not plan to make any significant revisions to the 1-2-3 2.*x* for DOS line, although it will continue to add support for new printers and other peripherals. **—Andrea Powers**

Meeting DOS Demands

Highlights of the planned upgrade to 1-2-3 3.x

- **Complete compatibility with earlier releases**
- **Worksheet tabs**
- **Live status bar**
- **Version management**
- **New @functions**
- **Spelling checker**
- **Integrated mail access**

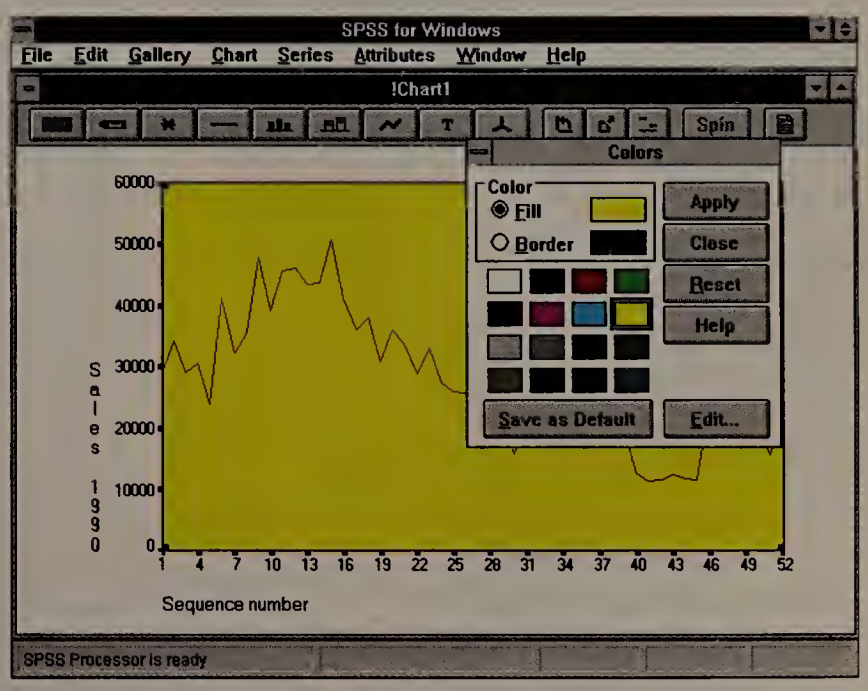
SPSS Adds Charts, Friendliness

With the second Windows release of its heavyweight statistical package, SPSS sheds most of its dowdy academic threads for a more comfortable fit in the business environment.

SPSS 6.0 for Windows' comprehensive menu system, liberal use of dialog boxes, and online help for statistical procedures and program features all boost ease of use. High-resolution graphics, a plethora of new charts, chart-editing capabilities, and a built-in report writer let you create professional-looking presentations (although SPSS can't match today's glittering Windows spreadsheets in this regard).

You can even incorporate your 1-2-3 macros into the SPSS menu system. Also, adherence to the Windows Open Database Connectivity standard makes it simpler to bring other forms of data into SPSS. All this ease of use doesn't mean loss of power—SPSS 6.0 for Windows gives you the same heavy-duty number-crunching power you got in the IBM and VAX mainframe versions. It even lets you run in batch mode.

SPSS 6.0 for Windows offers everything the professional statistician could want, but people who don't need all that analytic power will not have to waste system resources or money on it. SPSS's modular packaging allows you to create a system with only the tools that you need. Most business users will find all the tools essential to their work in the Base module, but statisticians who need to be on the cutting edge will want capabilities available in the Professional module.



SPSS'S WEALTH OF CHART TYPES AND CHART-EDITING TOOLS lets you create professional-looking reports and presentations.

Still, SPSS doesn't come cheap. To run the $695 Base module, you'll need a 386-class PC or better, 4MB of memory (8MB is recommended), 20MB of hard disk space, and Windows 3.1; a math coprocessor is recommended. When you're considering adding modules, choose carefully, because they add to the total price. The Professional module costs an additional $395, and the Advanced Statistics module $495. SPSS can be reached at 800/543-2185 or 312/329-2400. **—Ann Kremers**

EDITORS CHOICE: TOP ADD-ONS FOR 1-2-3

Speed your work by extending 1-2-3 with these best-of-breed add-ons and templates.

A jack-of-all-trades, 1-2-3 is always ready to create a financial report, perform statistical analysis, graph sales results, or balance your checkbook. But for all 1-2-3's skills, sometimes it needs a hand from an add-on package.

It's true that many functions that used to be performed by add-ons have been grafted onto the spreadsheet over the years—for example, 1-2-3 release 4.0 for Windows includes dozens of @functions missing from the earlier releases. But there are some features that the spreadsheet will probably never include, like the capability to create compiled programs. And some jobs that 1-2-3 handles can be done faster, easier, and maybe even cheaper with an add-on.

So *PC World Lotus Edition* editors searched for the best add-ons and templates available for 1-2-3 users. Here's a rundown of our favorites for 1993; suppliers are listed on the last page of the article. If your favorite add-on isn't included, let us know!

DAVE EMBER

CARUN

BOOST THE @FUNCTION FAMILY

Some of us use 1-2-3 as a programming tool and spend the most time with its macro language. Others, especially financial types, love the built-in @functions. But the @functions that come with 1-2-3 releases 2.*x* and 3.*x* can't begin to cover all the calculations you might need. If you still use a financial calculator as well as 1-2-3 to get your job done, consider expanding your @function library with these tools.

Check Out These New Acquisitions

GreyMatter International sells three packages of @functions, collectively known as @Library. Once the add-in is attached, 1-2-3 can use the @functions as if they were built into the spreadsheet.

The General Applications library, which contains 48 @functions, offers the broadest appeal. The collection includes financial and mathematical functions, more versatile lookup functions, and new versions of the statistical functions that ignore 'NA,' 'ERR,' labels, and blanks in argument ranges. Another winner is @SELSUM, an improved @DSUM, which lets you embed criterion range information in the argument list. The package includes an additional add-in that provides on-line help for the new functions.

The other two @function add-in libraries are more specialized. The Scientific and Engineering Applications package includes 41 trigonometric, hyperbolic, bessel, beta, and gamma functions, to name just a few. The 45 functions that are included in the Statistical Applications package cover univariate statistics, t-tests, and analysis of variance.

Using these new functions can extend the life of 1-2-3, simplify formula development, and often eliminate the need for macros. The only caveat is that co-workers who receive your worksheets must own the appropriate @Library package.

Each @Library set is available for $79.95 from GreyMatter International. It includes add-ins for 1-2-3 releases 2.*x* and 3.*x* and for Symphony. —*John Walkenbach*

Expand 1-2-3's Financial @Function Portfolio

If you need advanced loan calculations, Financial Toolkit may be the perfect add-in. Financial Toolkit not only provides additional @functions, it gives you six methods for obtaining the results of the familiar 1-2-3 @functions. For example, you can calculate a partial period remittance for payments due at the end or beginning of each period. You can also solve for the partial payment when the payment is interest only, or when there's no money due for the partial period but interest still accrues.

Financial Toolkit is available for $199.95 from Intex Solutions. It requires 10K of RAM and works with 1-2-3 releases 2.*x* and 3.*x* and with Symphony. —*Andrea Powers*

Create Your Own

If you've tried all the @function library add-ins and still haven't found the function you're looking for, why not create your own? 3-2-1 Gosub lets you create new @functions in a 1-2-3 worksheet. 3-2-1 Gosub enables several new @functions, which you then use to create your own custom @functions, so you get exactly the tools you need. You can also minimize memory use by replacing multiple copies of a complex formula with a simpler custom-designed function.

The 3-2-1 Gosub add-in must be attached whenever you load a worksheet that uses any custom @functions—unless you've converted the functions to a separate @function add-in using a separate program provided. The types of @functions you can create are limited, since the "code" you write to perform the calculations can't call 1-2-3 macros. Plan to spend some time studying the examples and reading the 100-page manual.

The 3-2-1 Gosub Developers Edition works only with 1-2-3 release 2.*x*. The package is available for $249.95 from Intex Solutions. —*J. W.*

TURN YOUR SPREADSHEET INTO A PUBLISHING WIZARD

Wysiwyg technology has had a profound effect on the spreadsheet. Hesitant to rely on their numbers alone, spreadsheet users are turning to add-ins that work with 1-2-3 to emulate popular graphics packages. If you want to create a slide show or just generate a graph that's not available in the DOS releases of 1-2-3, check out one of these products.

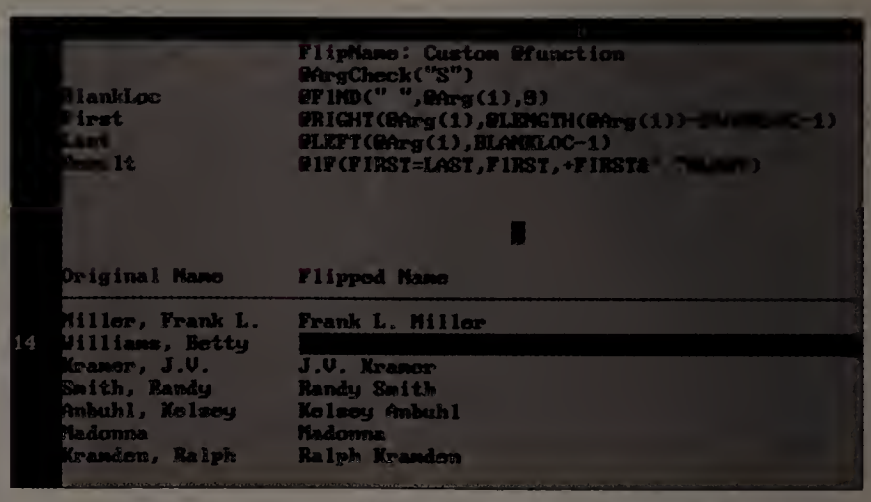
Add-In an Art Department

Need a top-notch graphics program to enliven the facts and figures in your work-

Financial Toolkit

This package offers a rich set of @functions that calculate several financial measures.

- Average life
- Interest rate caps
- Depreciation
- Duration
- Remaining balance after each payment
- Effective yield
- Future value
- Interest rate
- Interest rate for given total interest
- Nominal yield
- Interim payment amount
- Payment amount
- Number of periods
- Total interest
- Range of interest rates and payments



THIS CUSTOM FUNCTION, NAMED @FLIPNAME, was developed with the 3-2-1 Gosub add-in. The formulas in B1..B6 are executed in sequence, and the value in the last cell is returned.

sheets? If you're using 1-2-3 release 2.*x*, look no further than Spreadsheet Presenter (formerly Success from PC Publishing). It's an impressive, low-cost add-in that generates presentation-quality graphics from 1-2-3 data. Spreadsheet Presenter includes most of the tools of stand-alone graphics packages that cost hundreds of dollars more. There's an outliner for creating slides, a light table for arranging them, and a view window for judging the effect of your handiwork. Special effects include several dozen transitions and popular gradation (or *wash*) backgrounds, in which one color fades gradually into another.

Most important, though, is Spreadsheet Presenter's seamless integration into release 2.*x*. To add a range of worksheet cells to a slide, you simply point at them. Worksheet graphs are also simple to add. If you change the data in the worksheet later, the change is reflected automatically in the cells or graphs displayed in your slide.

When you're finished creating slides, you can print them, export them to disk files that can be output as film slides, or compile them into a stand-alone EXE file that runs a computer screen show from DOS. Spreadsheet Presenter's documentation is extensive and easy to understand, and is filled with illustrations that provide ideas for your own presentations.

Spreadsheet Presenter from Intex Solutions costs $159.95. It requires Impress or Wysiwyg and 40K of RAM. —*Kelly R. Conatser*

Add to 1-2-3's Gallery of Graphs

Intex Solutions' 2-D Graphics, an add-in for 1-2-3 release 2.*x*, offers nine new graph types, including polar, radial, and bubble, and offers improved versions of standard 1-2-3 graphs.

Once 2-D Graphics is loaded, you can bring up any worksheet, select a data range, and choose the graph type from a menu list. You can also label the axes, set data ranges, and rotate and otherwise manipulate the positioning of the graph.

All this, however, must be done from outside the graph. You can't manipulate or change the graph while you're viewing it. Any release 2.*x* user who needs more graph types than 1-2-3 provides will appreciate 2-D Graphics' flexibility and ease of use.

3-D Graphics expands 1-2-3 release 3.*x* by delivering five new 3-D graph types, including surface graphs. 3-D Graphics works in much the same way as its two-dimensional sibling. It installs and loads just like any 1-2-3 add-in, and it provides menus from which the user can select the graph type, label the axes, and manipulate the look of the graph.

2-D Graphics and 3-D Graphics list for $99.95 each from Intex Solutions and require 60K of RAM. —*Peter D. Varhol*

RUN A UTILITY VEHICLE

Utility add-ins are to 1-2-3 what peripherals are to your computer: They speed it up, provide missing functionality, and generally make it sing.

Teach 1-2-3 How to Spell

If you've ever been embarrassed by misspellings in your 1-2-3 worksheets, then Spellin is a must. Spellin checks the spelling of all worksheet labels, and because it was designed to run with 1-2-3, it can recognize macro commands and keynames. You can proof the spelling of an entire worksheet or limit the checking to just a cell or a range. You can choose to ignore the flagged word, see a list of alternate spellings, view the word in context, or change the spelling yourself. Spellin also flags repeated words and sentences or proper nouns that are capitalized incorrectly.

Spellin includes two dictionaries, American English and British English, that contain more than 90,000 words. You can also create a custom dictionary to store proper nouns and other words that appear in your worksheets but aren't included in the main dictionaries. Spellin offers an extensive online help facility that you access by pressing **<F1>**.

The Spellin add-in is available in two versions, one for 1-2-3 release 2.*x* and one for 1-2-3 release 3.*x*. Spellin lists for $125 from Intex Solutions. —*Catherine Kenny*

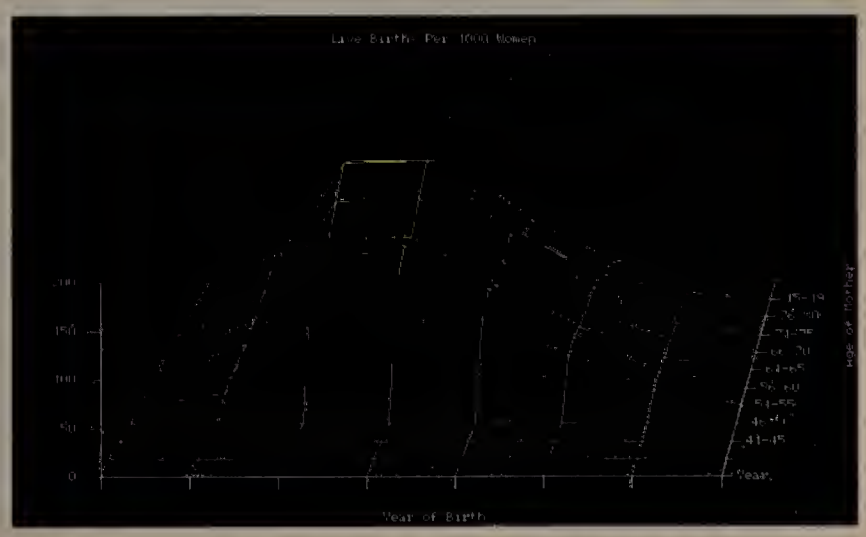
Call In the Search Party

Rescue Plus is a stand-alone utility that you can use to search for, view, and recover corrupted 1-2-3 files and to find a lost or forgotten password.

When presented with a corrupted file, Rescue Plus finds the cluster numbers in correct order and arranges them into a file. However, restoring the file completely so it can be used in 1-2-3 still requires time and effort.

Rescue Plus requires 256K of RAM and is available in two versions: Edition I recovers release 2.*x* files and costs $129.95; Edi-

SPREADSHEET PRESENTER'S Outliner and Preview window lets you create slides from worksheet data. Here, a range is displayed in a table along with a title, footnote, and a gradation background.



AMONG THE THREE-DIMENSIONAL GRAPHS available in 3-D Graphics is the surface plot, which plots different data values as hills on a surface.

tion II recovers release 3.*x* files and costs $149.95. Both editions are sold by Intex Solutions. —*John Thompson*

Transport Your ASCII Files to 1-2-3

Want to translate ASCII text files into a 1-2-3 worksheet? That is the sole function of Trans, the essence of simplicity.

Trans has no menus; it does everything from the DOS prompt. All you do is type **TRANS123** and the source file name. You can specify the worksheet file format to be created (WK1 or WKS) by simply adding an option to the command line. Other options include commands that control column placement, convert fractions to numeric entries, eliminate duplicate headings, and treat numbers with a leading zero as labels. Trans generates two output files: a worksheet file and a log file containing progress and error messages.

With simplicity come limitations. Source files cannot exceed 500 characters per line or 50 worksheet columns. Input files must also have clean, easily identifiable column breaks.

Trans lists for $125 from Intex Solutions. —*Nicole Pappas*

Tighten the Reigns

Monarch gives new meaning to file translation programs by adding a data management function, letting you massage your data and create custom reports.

Input files must be fixed-format text, but Monarch does provide a utility that prepares files such as dBASE and ASCII-delimited files for input. On the output side, Monarch creates worksheets for all versions of 1-2-3, as well as comma-delimited ASCII, fixed-length ASCII, and dBASE III Plus files.

Once Monarch has retrieved a file it gives you full reign over the data. In essence, you build a database of records from the input file. You query and select records, analyze records, create new fields, and ultimately print a report. Monarch helps you make the most of your time by letting you save and reuse models and by providing context-sensitive help.

Monarch is available for $495 from Personics Corporation. —*N. P.*

Take a More Direct Route

Roundtrip takes you by the hand and helps you get your data in the right place and in the right format. You get the standard file translation functions along with basic database management functions, and a whole lot more. In short, Roundtrip is an industrial-strength package geared toward heavy business applications.

Roundtrip categorizes input and output files by type—worksheet, ASCII, or binary. It works with any WK1 or WKS worksheet. Most important, your input files don't have to be crisp, clean, and easy to read. Roundtrip lets you define a master file that contains layout and design information you can apply to worksheets, unformatted reports, and ASCII files.

Roundtrip costs $495 from Circle Systems. —*N. P.*

TURN 1-2-3 INTO A FINANCIAL CALCULATOR

Most 1-2-3 add-ons are financial products. They range from simple templates that provide easy-to-use forms and quick calculations to complicated report generators.

Bring Wall Street to Main Street

Advanced Total Investor by Village Software provides portfolio management and stock analysis for the personal investor.

The portfolio management function displays a template that looks like a brokerage account statement. The template tracks all brokerage transactions, positions, and cash balances. It also records capital gain/loss information. However, it does not include selling and buying prices in the transaction entries of stock trades.

Most 1-2-3 add-ons are financial products, ranging from simple templates to complicated report generators.

The package provides more than 40 techniques for calculating market and trend indicators, including moving averages, Bollinger, directional movement, parabolic, relative strength, cash flow, on-balance volume, and Chaiken Oscillator. Each technical indicator can be displayed and graphed in a variety of ways. For serious investors, especially those who prefer to use discount brokers, Advanced Total Investor offers a solid portfolio management package for short money.

Advanced Total Investor lists for $99 from Village Software and works with 1-2-3 releases 2.*x* and 3.*x* and with 1-2-3 for Windows. —*Michael White*

Report Your Finances in Three Dimensions

The Fast-Cast template produces pro forma financial statements for corporations. You enter the needed financial data into the pages of a 3-D model, and Fast-Cast prepares monthly, quarterly, or annual balance sheets, profit statements, and cash-flow statements.

Like Profit Planner Plus and other financial forecasting templates, Fast-Cast is designed for people skilled in financial forecasting and business planning but not in building 1-2-3 models.

Fast-Cast is available for $65 from Village Software and works with 1-2-3 releases 3.*x* and 1-2-3 for Windows. —*Stephen Nelson*

Report Your Profits, Plan for More

Profit Planner Plus helps you create profit-and-loss statements, cash-flow statements, and balance sheets. It also calculates more than 70 standard financial ratios and produces common financial statements. You enter the needed financial data and Profit Planner Plus does the rest.

Profit Planner Plus is best suited for financial analysts and business planners who understand the mechanics of financial forecasting and business planning but who don't possess the 1-2-3 skills to build their own worksheet models. These folks might run Profit Planner Plus to build the annual operating budget.

Profit Planner Plus, $99 from Village Software, works with 1-2-3 releases 2.*x* and 3.*x* and with 1-2-3 for Windows. —*S. N.*

Chart Your Company's Health

Dynamic Financial Logic Corporation's Financial Analyst WK1 template creates a variety of reports that let you monitor your business's health. The reports incorporate up to eight years of data and provide enough detail for everyone's needs—more than 45 pages of text and graphs.

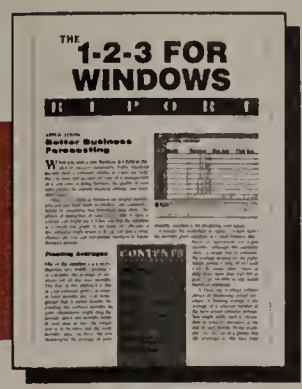
1-2-3 for Windows makes you good...

From macros to model-building, formulas to forecasting, page setup to printing, *The 1-2-3 for Windows Report* makes it easy to become a 1-2-3 authority.

Let our technical experts—people who rub elbows with the software engineers, product managers, and specialists at Lotus Development Corp.—share their secrets of spreadsheet success with you:

- Step-by-step how-to's for writing powerful macros
- Practical applications you can put to use right away
- Great ideas for getting the most from your database
- The latest on upgrades and new products

The 1-2-3 for Windows Report makes you better!



Call or return this card today for a FREE trial issue of *The 1-2-3 for Windows Report*. If you like it, you'll get 11 more issues (12 in all) for just $49 — a savings of 38% off the regular rate.

Name _____

Company _____

Street _____

City, State, Zip _____

Tel: (_____) _____ 41160

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1106 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

SUBSCRIPTION DEPARTMENT
THE 1-2-3 FOR WINDOWS REPORT
P O BOX 54396
BOULDER CO 80323-4396

The reports include a detail of the positive or negative effect of changes in each element of your company's operating statement; a variety of ratio analyses that should let everyone know how they're doing; and a one-page executive summary.

On the downside, you cannot use Financial Analyst to create monthly reports or compare current results with industry standards. It's more expensive than other products here, but it's worth the price.

Financial Analyst lists for $495 from Dynamic Financial Logic Corp. It requires 2MB of RAM and runs in 1-2-3 releases 2.3 and 2.4 with Wysiwyg attached.

—*Walter C. Schmidt*

Fortune Telling by Formula

Geneva Financial Forecasting and Geneva Financial Consolidation are sophisticated and rather elegant 1-2-3 release 3.*x* add-in programs for the savvy business user. Financial Forecasting generates estimates from historical results by using five methods: trend analysis, statistical seasonal forecasting, goal seeking, percentage of growth, and averaging. Geneva Financial Consolidation handles multiple exchange rates and intercompany eliminations and accounting adjustments.

Geneva Financial Forecasting and Geneva Financial Consolidation require 2MB of RAM, but 4MB and a 386 or better are also recommended. They are available for $495 each from Pizzano and Company. —*A. P.*

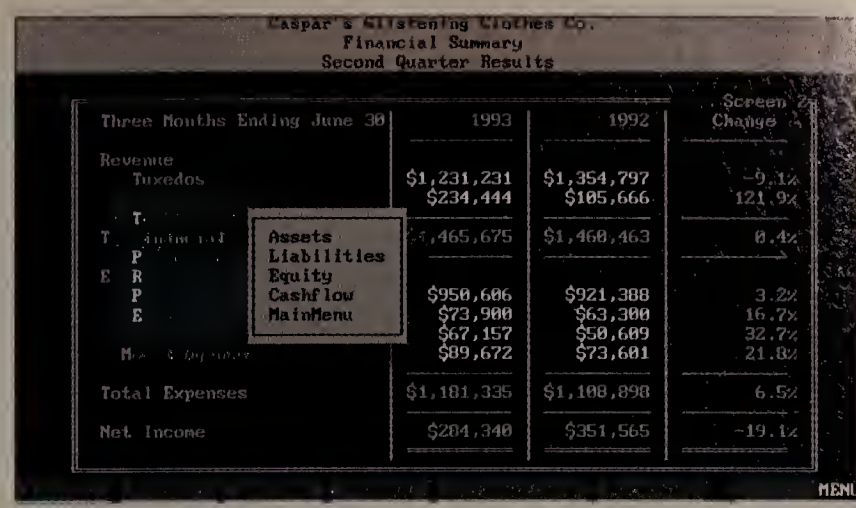
CREATE YOUR OWN PROGRAMS WITH SPREADSHEET COMPILERS

When you send a template for others to complete, some people just can't help redesigning it a little. Compilers let you protect your worksheets so they stay the way you designed them. In addition, they let you create sophisticated and professional applications.

Put Your Macros on Ice

Ice gives release 2.*x*'s macro language the boost it needs to help spreadsheet macros look and run like full-fledged DOS applications. The two add-in files that constitute Ice add more than 70 macro keywords to the release 2.*x* macro language.

Ice lets you create customized pop-up menus, change the colors of 17 components of the 1-2-3 display (such as the mode indicator and the first letters of menu commands), and remap the keyboard so alphanumeric and function keys perform macro subroutines instead of their normal 1-2-3 functions. To further foolproof the application, you can restrict cell pointer movement to a designated area of the worksheet, disable specific 1-2-3 menu commands, display custom messages anywhere on screen, validate data entry, and create custom help screens.



ICE LETS YOU TRANSFORM WK1 FILES INTO RUN-TIME PROGRAMS with little resemblance to a spreadsheet. For stand-alone programs that leave 1-2-3 behind entirely, Baler also offers a full-fledged compiler, as does rival Sheng Labs.

After debugging your application in 1-2-3, save the worksheet, then use Ice to build a run-time file, which you distribute to other release 2.*x* users. When a user types the name of your run-time file at the DOS prompt, Ice loads 1-2-3, retrieves your worksheet, and launches your macro. Ice is one of the most comprehensive 1-2-3 add-ins ever created, and it's a bargain for macro programmers who send custom applications to release 2.*x* users. The program requires 80K of RAM and sells for $395 from Baler Software. —*K. R. C.*

Lock Your Macros Into Stand-Alones

If you're an application developer who wants to remain within the familiar 1-2-3 environment, but you aren't sure if end users will have 1-2-3 installed on their computers, it's time to move to a full-fledged spreadsheet compiler such as Baler or BalerXE. Like Ice, both programs extend 1-2-3's native macro language with dozens of keywords that give you complete control over the screen and keyboard. Both also allow you to create custom help screens and title screens that give your application a professional appearance.

However, Baler and BalerXE don't work as 1-2-3 add-ins. Instead, they convert the WK1 file you create into a stand-alone EXE file that can run by itself from the DOS prompt. During the conversion, the formulas in your worksheet are compiled, preventing anyone who uses your finished application from modifying—or even seeing—them. Additionally, macros in compiled worksheets run several times faster than the originals, depending on the commands and the number of formulas that are involved.

At $495 and $795, Baler 6.0 and BalerXE 2.0 aren't cheap. (For the higher price, BalerXE lets you integrate C routines into your compiled worksheet, print PIC graph files, and read and write DBF database files.) But for number-intensive applications, these products can save untold hours by allowing you to develop in 1-2-3 rather than a more complex programming environment. Baler and BalerXE are available from Baler Software. —*K. R. C.*

Compile and Accelerate

King Jaguar, a $595 program from Sheng Labs, works in basically the same way as BalerXE. It offers a smaller extended macro language that lets you create many of the same features, such as customized pop-up menus, message boxes, title screens, and help screens.

However, there are important differences between King Jaguar and BalerXE. King Jaguar compiles both formulas and macros when it creates a run-time file, giving some applications a performance advantage over their Baler counterparts. As an added bonus, King Jaguar checks the syntax of your macro commands as it compiles the code and flags inaccurate entries. If your

macros are syntactically correct but still don't work properly, you can use King Jaguar's sophisticated MacroView debugger to pinpoint the problem. And for users who enjoy programming outside the spreadsheet, King Jaguar allows you to integrate not only C routines, but routines written in assembly language as well.

The downside to all this power is an added level of complexity. Unlike Baler's one-size-fits-all compiler, King Jaguar makes you use a different version of the compiler if your worksheet contains features such as graphs. The documentation also lists several features that may cause a macro to be incompatible with King Jaguar's compiler even though it works fine in 1-2-3. King Jaguar is available for $595 from Sheng Labs. —*K. R. C.*

OLDIES BUT GOODIES

Stay on Home Base

Users of 1-2-3 release 2.*x* can build and manage database applications from within a worksheet by using Personics' @BASE.

@BASE stores records on your computer's hard disk, rather than in RAM, and maintains dynamic links between the database and the worksheet. It lets you search, select, sort, browse, edit, and delete records using statistical, logical, and database @functions. @BASE lets you sort a database using any number of fields, rather than the standard two fields in 1-2-3. And the Query process is available from the command menu. @BASE can open many databases, each with its own query. The traditional 1-2-3 view is the same except for the column headings, which show the record number and field names instead of a column letter.

@BASE benefits the serious database user who needs a database's search capabilities, filter selection, and 1-2-3's computational functions, or anyone who uses many small databases frequently.

@BASE is available for $195 from Personics Corporation. —*J. T.*

Open a Window on Your Formulas

If you've ever wished you could see a cell's entire contents, or calculate parts of a formula and see each individual result, wish no more. Funk Software has the add-in for you: Formula Editor@.

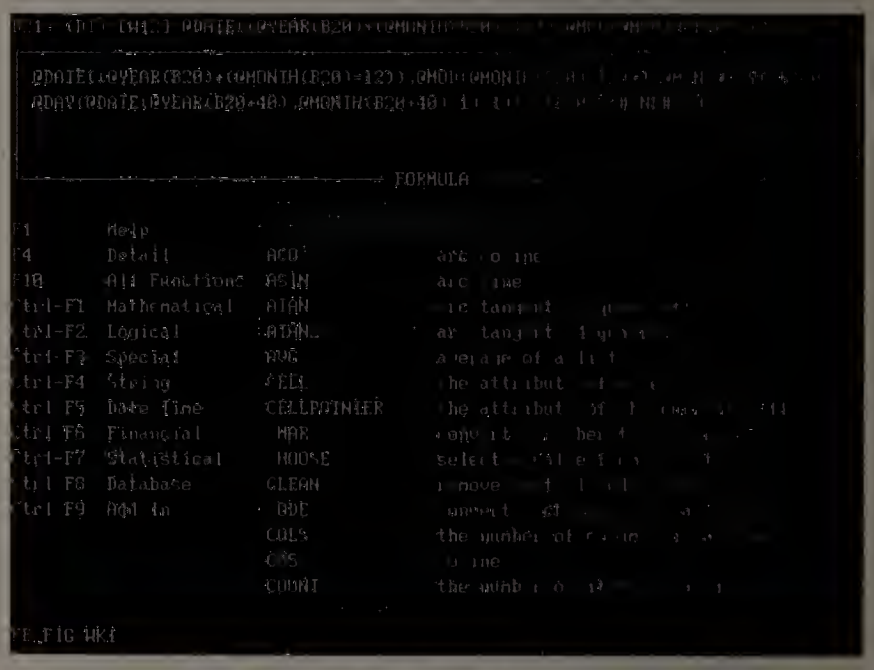
Veteran 1-2-3 users will recognize Formula Editor@ from Funk's Worksheet Utilities add-in. The Worksheet Utilities are still available, but many of those tools have been superseded by features in new releases of 1-2-3. Funk has made creating, editing, and debugging much easier by making the Formula Editor available as a separate add-in.

When you invoke Formula Editor@, the formula contained in the active cell appears in the Formula window. You can use your usual editing keys (cursor control keys, <Delete>, <Backspace>, and so on) to move around and edit your formulas. But Formula Editor@ goes way beyond this. It lets you insert arithmetic operators, cell addresses, range names, and @functions directly into your formula by choosing them from lists. Pressing <F10>, for example, displays a window in the lower right corner of the screen and displays @functions you can insert into your formula.

You can also determine which sets of parentheses are associated with which expression. The Calculate mode allows you to calculate and display the result of individual segments of your formula to help you determine which expression is guilty of an error. And you can use Formula Editor@ to display long labels and macro statements in the Formula window, though you won't be able to use the formula-related editing tools with them.

Formula Editor@ is a class act in every respect. The printed documentation is clear and concise, but you will probably find all the answers you need in the context-sensitive help screens.

Formula Editor@ is available from Funk Software for $99.95 and works with 1-2-3 release 2.*x*. —*David Maguiness*



FORMULA EDITOR@ LETS YOU VIEW FORMULAS longer than 80 characters in their entirety. You also can edit and debug them by adding arithmetic operators, cell addresses, range names, and @functions.

Kill Bugs Dead

The Macro Editor/Debugger from Personics Corporation is the ideal tool for both novice and expert macro writers. Anyone who's ever tried to figure out where a macro went wrong will appreciate the debugging capabilities of the Macro Editor/Debugger. Like Step mode in 1-2-3, the Macro Editor/Debugger helps users find and debug errors in their macro code. But the Macro Editor/Debugger brings 1-2-3 macro writers to a new plateau by providing watchpoint and breakpoint tools.

Using the Macro Editor/Debugger is easy. You load the add-in, point to the macro you want to test, and set execution to full speed, one cell at a time, or one instruction at a time. When the program finds an error, it lets you edit and enter new code without exiting the macro, then resume the macro where you left off. The Macro Editor/Debugger provides more than 150 expanded error messages to help you pinpoint and solve problems.

Watchpoints and breakpoints let users monitor specific worksheet cells during macro execution. Watchpoints show which instruction caused an error and why. Breakpoints instruct the Macro Editor/Debugger to put the macro on hold whenever a specified event occurs. You can then check watchpoint values, move around the worksheet, or edit the macro.

The add-in, from Personics Corporation, costs $199.95. It works with 1-2-3 release 2.*x* and uses 65K of RAM. —*C. K.*

Put Your Worksheet on its Ear

Printing 1-2-3 worksheets in landscape mode has always been tricky, if not downright impossible, especially on a dot matrix printer. If you haven't yet upgraded to 1-2-3 release 2.4 or release 3.4, do yourself a favor and get Sideways. Sideways works transparently with your printer to print your worksheets in landscape mode. On the downside, you cannot print formatting applied with Wysiwyg. But Sideways does provide some limited formatting capabilities. You can choose paper size, select fonts, specify character and line spacing, and add formatting effects such as boldface, underlining, and italics.

Sideways runs as a stand-alone program or as an add-in for 1-2-3 releases 2.01, 2.2, 2.3, 3.1, and 3.1+. Sideways also works with WK1 and WKS files as well as ASCII text files. When used as a 1-2-3 add-in, Sideways requires about 80K of RAM. Sideways is available for $89.95 from Funk Software. —*C. K.*

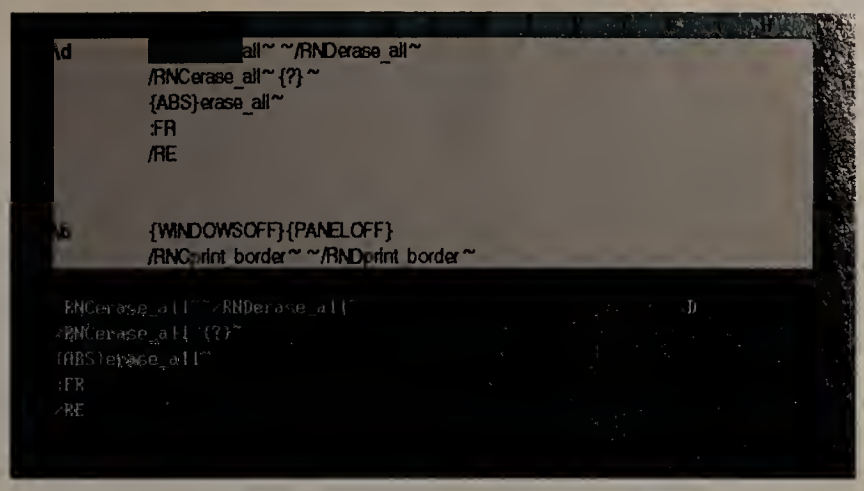
Any 2.x user who's ever tried to find where a macro went wrong will appreciate the Macro Editor/Debugger.

Squeeze Your Files Into Tighter Spaces

One of the original add-ins for 1-2-3, Sqz was developed so you could get more from your hard disk by reducing the size of worksheets. Sqz works with all versions of 1-2-3 (except 1-2-3 release 4.0 for Windows) and Symphony. When you invoke Sqz, you're presented with the Sqz menu and status window. The Sqz menu includes options for enabling and disabling worksheet compression, and it lets you choose how you want your file compressed, although Sqz's default settings are sufficient for most day-to-day file compressing/decompressing.

Once Sqz is attached, it operates without further intervention. When you issue a File Save command, for example, Sqz intercepts your worksheet before it's saved to disk, compresses it, and then saves it to disk with a WK! extension (W3! in release 3.*x*), so you can identify it as a squeezed file. Conversely, when you issue a File Retrieve command with Sqz attached, Sqz intercepts the command and decompresses your file before loading it into memory.

You can customize Sqz, perform batch file operations, recover damaged Sqz files, and display the history of a squeezed file. Also, you'll want to send along a copy of the separate utility, Unsqz, when you send a squeezed file to a colleague who doesn't own Sqz.



TRACK DOWN ERRORS in your 1-2-3 macros with the Macro Editor/Debugger.

The add-in works seamlessly with 1-2-3. In one typical test, it compressed a 42K file down to 12K—a 70 percent savings in disk space—while using about 65K of RAM. Sqz does not provide online help, but the documentation is more than enough to get you up and running. If you're running out of disk space or you need to send files electronically, you need Sqz.

Sqz, from Symantec, costs $99. It works with 1-2-3 releases 2.*x* and 3.*x* and with 1-2-3 for Windows release 1.*x*. —*D. M.*

Kelly R. Conatser is a frequent contributor to PC World Lotus Edition *and a consultant specializing in spreadsheet application development; David Maguiness wrote about modernizing older applications in the May issue of* PC World Lotus Edition; *Nicole Pappas runs an in-house computer user group for a major western utility and has been using and teaching others to use personal computers since 1981; Walter C. Schmidt is a partner in the CPA firm of Coughlin, Foundotos, Cullen & Danowski in Port Jefferson Station, New York; John Thompson is an employee of the Massachusetts Welfare Department and editor of the* Lotus Group Newsletter *for the Boston Computer Society; Peter D. Varhol is a technology writer and assistant professor at Rivier College in New Hampshire; John Walkenbach is a freelance writer based in San Diego, and his most recent book is* Developing Applications with Quattro Pro for Windows *(Title Wave Press, San Jose, 1993); Michael White is a systems analyst at State Street Bank in Boston. Catherine Kenny is an assistant editor, Stephen L. Nelson a contributing editor, and Andrea Powers an associate editor for* PC World Lotus Edition.

WHERE TO BUY

Baler Software Corp.
800/327-6108, 708/506-9700, 708/506-1808 (fax)
Reader service no. 769

Circle Systems
800/366-3794, 206/682-3783, 206/328-4788 (fax)
Reader service no. 770

Dynamic Financial Logic Corp.
800/396-2642, 215/667-6250
Reader service no. 771

Funk Software Inc.
617/497-6339, 617/547-1031 (fax)
Reader service no. 772

GreyMatter Int'l
617/876-6969, 617/876-6452 (fax)
Reader service no. 773

Intex Solutions Inc.
617/449-6222, 617/444-2318 (fax)
Reader service no. 774

Personics Corp.
508/658-0040, 508/988-0105 (fax)
Reader service no. 775

Pizzano and Co.
617/935-7122, 617/245-9540 (fax)
Reader service no. 776

Sheng Labs
800/548-1270, 503/646-3691, 503/641-8822 (fax)
Reader service no. 777

Village Software
800/724-9332, 617/695-9332, 617/695-1935 (fax)
Reader service no. 778

Save $40 Introductory Offer!

30 Day Money Back Guarantee!

WiseGuides!

Expert system software easier to use than...

1-2-3

Now you can build complicated custom spreadsheets in minutes!

Throw out your manuals and self-help books! WiseGuides Expert System is a key-stroke cutting, time slashing software tool that will make you instantly more productive...and it's so easy to work with.

WiseGuides uses its knowledge base of spreadsheet rules to logically walk you through spreadsheet functions. As you answer the plain-English questions the Expert System automatically writes the macro needed to build your spreadsheet application.

All of this is done without your having to be proficient with spreadsheet conventions, formulas or macro programming.

WISEGUIDES ISN'T ANOTHER "HOW-TO" TOOL

IT'S A "DO-THE-WORK-FOR-YOU" TOOL.

ORDER NOW TOLL FREE: 1-800-713-2098

Professional spreadsheets in minutes.!

No more hard-to-follow keystroke sequences. WiseGuides has turned complicated programming procedures into simple key-stroke solutions (Graphing takes only a few keystrokes). Custom spreadsheets have never been easier. Infrequent spreadsheet users will be doing productive work instantly and experienced users will be carving time off every project.

Custom spreadsheets for Lotus 1-2-3 made easy.!

More than an add-in enhancement, WiseGuides is a stand-alone program. It automatically creates customized macros to your specifications, allowing them to be inserted directly into your spreadsheet.

The hypertext help system is designed to give the casual Lotus user in-depth guidance, while allowing the power user to select only unfamiliar information.

WiseGuides enhances, and adds functionality to the following:

- Design customized financial spreadsheets.
- Create range names for columns, rows and work areas. Format work areas.
- Design lookup tables and create formulas for vertical and horizontal tables.
- Create, extract and sort databases. Create and print graphs.
- Print spreadsheets. Create financial, statistical and database functions.
- Design dBase-like input templates for data entry verification.

You'll be amazed at how fast and easy it is to create complete power-packed custom spreadsheets. *Stop trying to figure out how to make your spreadsheet work and start working with your spreadsheet.*

Requirements:

Lotus 2.0 or above. 450K free memory. DOS 2.0 or above. $39.95 offer expires 11/30/93.

Order WiseGuides today and take advantage of our limited time offer of only $39.95. That's $40 off the list price of $79.95.

WISE GUIDES

Mail or Fax to: WiseGuides, Inc. • 3700 Airport Road • Suite 301 • Boca Raton • Florida 33431 • Fax: 407-391-5264

❑ YES! Please rush me WiseGuides for only $39.95. I have enclosed a total* of $_____

❑ Check Enclosed ❑ Visa ❑ MasterCard ❑ Expiration Date:_____

Card Number:_____ Signature:_____

Name:_____

Company:_____

Address:_____

City:_____ State:_____ Zip:_____ Phone: ( )_____

Please specify disk size ❑ 3 1/2 ❑ 5 1/4

** Add $5.00 shipping and handling ($10.00 International). Florida residents add 6% sales tax.*

© 1993 WiseGuides, Inc. All rights reserved. Lotus 1-2-3 is a trademark of the Lotus Coportation.

Circle 164 on reader service card

Use these three models to tackle common but elusive loan calculations.

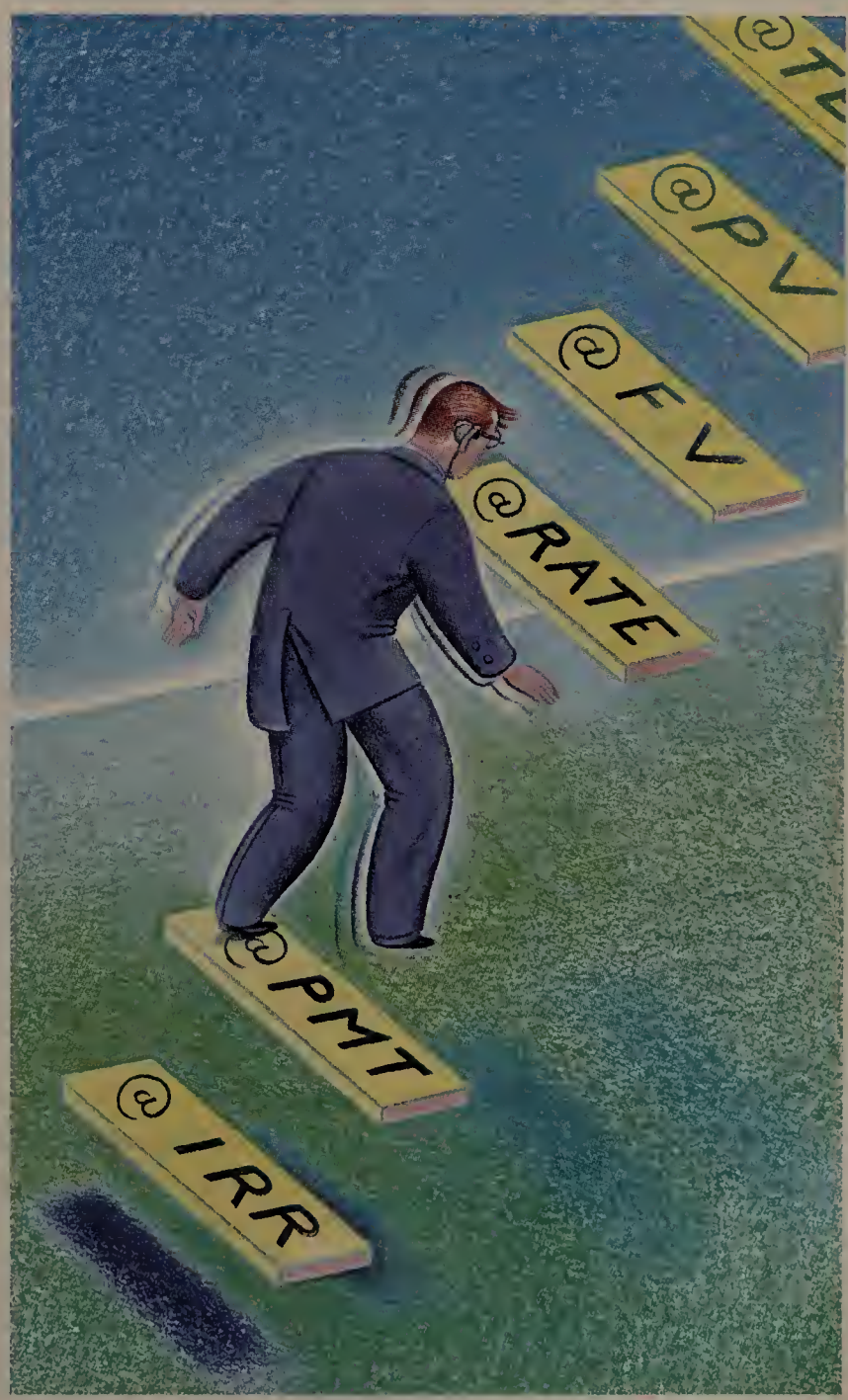
BY ANDREA C. POWERS

Financial Formulas That Lotus Forgot

If you need to find the future value of an investment or calculate the monthly payment on a loan you're considering, you just find the appropriate @function, supply the arguments, and 1-2-3 does the rest.

Yet 1-2-3 does not provide @functions for some common financial calculations. If you need to know the annual percentage rate of a loan or the principal and interest payments on an adjustable-rate mortgage, you may have to use a financial calculator or crack the textbooks. Even if there's an @function to solve the problem, you may not have all the arguments it requires. Say you want to find out how much interest you'd pay on an $80,000 loan with a monthly payment of $842 for 30 years. You can't use @RATE until you know the future value of the mortgage. You can't use @FV to calculate the future value until you find the interest rate. So you must find the answer the old-fashioned way—by doing the math yourself.

But here, we've done it for you. We'll show you how to calculate the interest on an adjustable-rate mortgage, figure the annual percentage rate (APR) on a loan, and find the missing arguments for the 1-2-3 financial @functions.



DAVE CALVER

Find Payments on an Adjustable Mortgage

Because the bank applies a new interest rate to the principal annually or biannually, figuring out how much of the monthly payment on an adjustable-rate mortgage goes toward the principal and how much goes toward the interest can be tricky. And 1-2-3 doesn't provide one simple @function for this problem. Still, there's an easy solution.

The worksheet shown in **FIGURE 1** uses two of 1-2-3's @functions—@PMT and @PV—to calculate the interest and principal payments of an adjustable-rate mortgage. Note that to conserve space, we removed some rows from the figure. To build the model,

	A	B	C	D	E	F	G	H	I
1	ADJUSTABLE RATE MORTGAGE								
2									
3									
4	Date	Rate	Year	Total	Payment	Period	Balance	Principal	Interest
5						0	$169,000.00		
6	Jul-92	6.000%	30	$169,000.00	$1,013.24	1	$168,831.76	$168.24	$845.00
14	Mar-93					9	$167,455.20	$175.09	$838.15
15	Apr-93					10	$167,279.23	$175.96	$837.28
16	May-93					11	$167,102.39	$176.84	$836.40
17	Jun-93					12	$166,924.66	$177.73	$835.51
18	Jul-93	7.000%	29	$166,924.66	$1,121.95	13	$166,776.44	$148.22	$973.73
19	Aug-93					14	$166,627.35	$149.09	$972.86
20	May-94					23	$165,245.80	$157.10	$964.85
21	Jun-94					24	$165,087.79	$158.02	$963.93

FIGURE 1: CALCULATE THE PRINCIPAL AND INTEREST PAYMENTS for an adjustable-rate mortgage.

follow the instructions in "Calculate Payments on an ARM."

The @PMT formula in cell E6 returns the monthly payment for the first year of the loan: $1013.24. Formulas in range H6..H17 subtract the current loan balance from the previous balance to return the principal payment. Formulas in range I6..I17 subtract the principal from the monthly payment to get the interest payment.

To calculate the principal and interest payments for the second year of the mortgage, expand the model: Place the cell pointer in cell B18, select */File•Combine•Copy•Named/Specified-Range*, indicate range B6..I17, highlight the file name, and press **<Enter>**.

Next, copy the formula in cell A17 to range A18..A29. Enter **0.07** in cell B18 and **29** in cell C18. The formula in cell D18 returns the new year-end balance. The @PMT and @PV formulas use these new values in their calculations. As you can see, the monthly payment for the second year of the loan has been adjusted to $1121.95 to reflect the higher interest rate. The amounts applied to the principal, in column H, have decreased and the interest amounts have increased.

This model doesn't round the results of formulas, so your results may differ slightly from your bank's. If there's a discrepancy of greater proportions, you may need to consult your banker.

Calculate the Annual Percentage Rate

If you're looking for a loan, you're probably receptive to low interest rates. But advertised rates aren't always what they seem. The published rate does not account for costs added to a loan, such as points. By law your bank has to disclose the APR to you, but disclosure usually occurs just as you're ready to apply for the loan.

CALCULATE PAYMENTS ON AN ARM

This model works in all releases of 1-2-3.

1. Global worksheet settings

Format: Currency 2

Select */Worksheet•Global•Format•Currency* and enter **2**. In 1-2-3/W select *Worksheet•Global Settings•Format•Currency*, type **2** in the Decimal Places box, and click *OK* twice. In 1-2-3 release 4.0 for Windows select *Style•Worksheet Defaults•Currency*, type **2** in the Decimals box, and click *OK*.

2. Labels and values

Enter the labels shown in range A1..I4, and enter the values shown in range B6..C6, cell F5, and cell G5.

3. Cell formats

FORMAT	RANGE
Date 3	A6..A7
General	C6, F5..F17
Percent 3	B6

To assign the Date 3 format, select */Range•Format•Date•3* and indicate range A6..A7. In 1-2-3/W select *Range•Format*, select *3:Dec-90* from the list of formats, and indicate range A6..A7. In 1-2-3 4.0 for Windows select *Style•Number Format*, select *Dec-93* from the list of formats, and indicate range A6..A7.

4. Column widths

COLUMN	WIDTH
D, G	13
E, I	11

To set the width of column D, position the pointer in column D, select */Worksheet•Column•Set-Width*, and enter **13**. In 1-2-3/W select *Worksheet•Column Width*, type **13** in the Width box, and click *OK*. In 1-2-3 4.0 for Windows, select *Style•Column Width*, type **13** in the Set Width to Characters box, and click *OK*.

5. Range names

NAME	RANGE	NAME	RANGE
payt	E6	term	C6
prin	D6	year1	B6..I17
rate	B6		

To assign a range name, select */Range•Name•Create*, enter the name, and specify the range. In 1-2-3/W preselect the range, select *Range•Name•Create*, type the name in the Range Name text box, and click *OK*. In 1-2-3 4.0 for Windows, preselect the range, select *Range•Name*, type the name in the Name text box, and click *OK*.

6. Formulas

CELL	FORMULA
A6	@DATE(92,7,1)
A7	(A6+33)-@DAY(A6+32)

Copy cell A7 to range A8..A17.

D6	+G5
E6	@PMT(prin,rate/12,term*12)
F6	+F5+1
G6	@PV($payt,$rate/12,(30*12-F6))
H6	+G5-G6
I6	+$payt-H6

Copy range F6..I6 to range F7..F17.

7. Save the file

To save the worksheet in 1-2-3 and 1-2-3 4.0 for Windows, select *File•Save* and enter a name not already listed in the directory. In 1-2-3/W select *File•Save As* and enter a file name.

Rather than wait until the last minute, why not calculate the APR yourself? Knowing the actual APR of a loan helps you compare loans and shop around. But calculating this can get confusing.

The worksheet in **FIGURE 2** uses an @PMT formula and an @IRR formula to find the APR of three loans with a one-year term. To build the model, see "Calculate the Annual Percentage Rate."

The @IRR function in cell B8 finds the internal rate of return of a series of cash flows made at equal intervals. To use the @IRR function on a loan that is paid monthly, you must enter all the monthly loan payments into the worksheet. For a 30-year mortgage paid monthly, this means entering data into a 360-row range. The amount you receive (the principal amount) is entered as a positive value, and the monthly payments are entered as negative numbers. This reflects the actual flow of cash.

The formulas in cells B6 and B7 return the principal amounts you'll receive: If there are points on the loan, the formula subtracts the points from the initial principal amount; if you're financing the points, the formula returns the initial principal balance in cell B6 and the adjusted payback amount in cell B7. In our example, one point equals 1 percent of the loan amount, and the points will be financed along with the principal balance (indicated by entering **Y** in cell B5). So on a $100,000 loan with 2 points, you'll receive $100,000 but have to repay $102,000. The formula in cell C6 subtracts 3 percent from the loan in cell C1 and returns $97,000; there are no points on the loan in column D, so the amount remains the same.

The formula in cell B10 returns the monthly payment of the loan as a negative value to reflect the cash outflow. Note that this formula uses the full amount of the loan—$100,000 in cell B6—not the adjusted amount in cell B7. Even though you receive a smaller amount on a loan with points, you still have to pay it back in full.

The formula in cell B8 finds the APR of each loan. The loan in column D, which charges a higher interest rate but no points, has the lowest annual interest rate.

To customize this worksheet, enter the principal loan amount in cell B1, the rate in cell B2, the term in cell B3, and the points in cell B4, and indicate whether to include the points in the financing in cell B5. For example, to find the APR on a 5-year loan, copy the formula in cell B21 to B22..B69 and reassign the range name Flows to include all the payments in range B7..B69.

Find Missing Data

If you've thought about buying a car or a house or taking out a business loan, you've probably tried to figure out how much you could afford to pay and for how long. The @PV, @FV, @PMT, @RATE, and @TERM functions can help you answer these questions, provided that you have all of the data each function requires.

	A	B	C	D
1	Principal	$100,000.00	$100,000.00	$100,000.00
2	Rate	7.0000%	5.0000%	9.0000%
3	Term	1	1	1
4	Points	2	3	0
5	Finance	Y	N	N
6	Get	$100,000.00	$97,000.00	$100,000.00
7	Payback	$102,000.00	$100,000.00	$100,000.00
8	APR	10.7332%	10.7286%	9.0000%
9	0	$100,000.00	$97,000.00	$100,000.00
10	1	($8,825.73)	($8,560.75)	($8,745.15)
11	2	($8,825.73)	($8,560.75)	($8,745.15)
12	3	($8,825.73)	($8,560.75)	($8,745.15)
13	4	($8,825.73)	($8,560.75)	($8,745.15)
14	5	($8,825.73)	($8,560.75)	($8,745.15)
15	6	($8,825.73)	($8,560.75)	($8,745.15)
16	7	($8,825.73)	($8,560.75)	($8,745.15)
17	8	($8,825.73)	($8,560.75)	($8,745.15)
18	9	($8,825.73)	($8,560.75)	($8,745.15)
19	10	($8,825.73)	($8,560.75)	($8,745.15)
20	11	($8,825.73)	($8,560.75)	($8,745.15)
21	12	($8,825.73)	($8,560.75)	($8,745.15)

FIGURE 2: FIND THE CHEAPEST LOAN by comparing annual percentage rates (APRs), which include the cost of points and other fees.

But what if you don't? The worksheet in **FIGURE 3** uses a combination of @functions and algebraic formulas to find the missing data. These @functions and formulas revolve around the five variables listed in column A. If you know the values of any three of these variables, enter them into column B, and the model will find the remaining two variables using the standard @functions in column C or by using our home-brewed formulas in column D. (1-2-3 release

CALCULATE THE ANNUAL PERCENTAGE RATE

This model works in all releases of 1-2-3.

1. Global worksheet settings

Format: Currency 2
Column width: 13

2. Labels and values

Enter the labels shown in range A1..A8 and the labels in B5..D5. Enter the values shown in range A9..A21 and the values in range B1..D4.

3. Cell formats

FORMAT	CELL
Percent 4	B2..D2, B8..D8
General	A9..A21, B3..D4

4. Range names

Select */Range•Name•Labels•Right* and indicate range A1..A8. In 1-2-3/W preselect range A1..A8, select *Range•Name•Label Create*, and click *OK*. In 1-2-3 4.0 for Windows, preselect range A1..A8, select *Range•Name*, select *To the right* in the For cells menu, click *Use Labels*, and then click *OK*. Assign the name Flows to range B9..B21.

5. Formulas

CELL	FORMULA
B6	@IF(finance="N",(principal -(points*0.01*principal)),principal)
B7	@IF(finance="N",principal,(principal +(points*0.01*principal)))
B8	@IRR(rate/12,flows)*12
B9	+B6
B10	-@PMT(payback,rate/12,term*12)
B11	@VALUE(B10)

Copy cell B11 to range B12..B21. Then copy range B6..B21 to range C6..D6.

Note that the formula in cell B8 initially evaluates to ERR.

6. Save the file

	A	B	C	D
1		Input	@Functions	Formulas
2				
3	Future Value	$44,892.09	$44,892.09	$44,892.09
4	Term	5.0	5.0	5.0
5	Principal	$32,000.00	$32,000.00	$32,000.00
6	Rate	7.00%	7.00%	NA
7	Payment	$7,800.00	$7,800.00	$7,800.00

FIGURE 3: HOW LONG WILL IT TAKE TO PAY OFF A LOAN? Here, we know the principal, rate, and payment of the loan but want to know how long it will take to pay it off and the real value of the loan. The formula in cell D4 uses the data in range B5..B6 to find a term of five years. When the value is copied to cell B4, the future value of the loan is revealed.

4.0 for Windows provides new financial @functions that replace many of the formulas used here. For more information, see *Q&A*.)

The worksheet is designed so the formulas in column D perform the same operations as the @functions in column C but use a different set of variables to achieve the results. For example, the formula in cell D3 finds the future value by multiplying the principal by the interest rate and raising it to the power of the term.

To see how the formulas operate, suppose you need $32,000 to start a small business, and the current interest rate for such a loan is 7 percent. You know that you can afford an annual payment of $7800. But how long will it take to pay off the loan, and how much will it really cost in the end? To build the model, follow the instructions in "Build the Missing Variables Model."

Plug the values you know into the model: Enter **32000** in cell B5, **.07** in cell B6, and **7800** in cell B7. Enter **0** to indicate the missing data—in this case, the future value in cell B3 and the term in B4.

The @FV function in cell C3 and the @TERM function in cell C4 return 0's because you are missing the future value and term arguments. But the formula in cell D4 finds one of the missing variables—a term of five years. By replacing the future value argument with a negative principal argument, you can determine how long it would take to pay back the loan. Copy the term argument to cell B4 by selecting *Range•Value*, indicating cell D4 as the range to copy from and cell B4 as the range to copy to.

When you do this, both the @FV function in cell C3 and the formula in cell D3 have the information they need (the term) to calculate the future value of the loan: $44,892.09. Use the *Range•Value* command again to copy the future value to cell B3. When you do this, the worksheet fills in the rest of the variables.

Sometimes it takes trial and error to find a missing variable. For example, when you know the principal, term, and payment amount of a loan, the formulas in columns C and D result in 0. This is because none of the @functions or alternative formulas use these three variables in their calculations. To find the rate, you'll have to enter a few different interest rates in column B. When the payment amount in cell C7 matches or is close to the payment amount in cell B7, you've found the missing variable.

The @IRR function can also be used to find the interest rate. The amount you receive (the principal amount) is entered as a positive value, and the payments are entered as negative numbers. This reflects the actual flow of cash. To try it, enter **+B5** in cell B10, **+B7** in cell B11, and **@VALUE(B11)** in cell B12. Copy cell B12 to range B13..B17. This represents the cash outflows, annual payments of $7800 for seven years. Enter **@IRR(0.10,B10..B17)** in cell B9. The formula returns an interest rate of 15.47 percent.

Andrea C. Powers is an associate editor for PC World Lotus Edition.

Models on Disk Includes the models, macros, and formulas contained in this article. To order, call 800/824-5520 or write to *PC World Lotus Edition,* Models on Disk, P.O. Box 1743, Salisbury, MD 21802-9830. Individual disks are $9.95. A full year's subscription is $89.95. This material is also available on CompuServe and from PC World Online; see page 12 for more information about PC World Online.

BUILD THE MISSING VARIABLES MODEL

1. Global worksheet settings

Format: Currency 2
Column width: 12

2. Labels and values

Enter the labels shown in Figure 3. Begin the entry in cell C1 with an apostrophe. Enter **"NA** in cell D6.

3. Cell formats

FORMAT	CELL
Percent 2	B6..C6
Fixed 1	B4..D4

4. Range names

NAME	RANGE	NAME	RANGE
fv	B3	rate	B6
term	B4	payt	B7
prin	B5		

5. Formulas

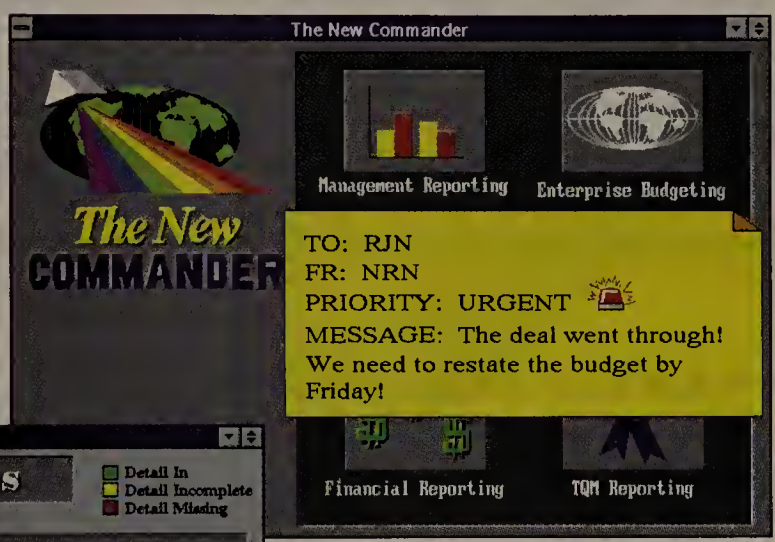
CELL	FORMULA
C3	@IF(rate=0,0,@IF(payt=0,0, @IF(term=0,0,@FV(payt,rate,term))))
C4	@IF(rate=0,0,@IF(payt=0,0, @IF(fv=0,0,@TERM(payt,rate,fv))))
C5	@IF(fv=0,0,@IF(rate=0,0, @IF(term=0,0,@PV(payt,rate,term))))
C6	@IF(prin=0,0,(@IF(fv=0,0, @IF(term=0,0,@RATE(fv,prin,term)))))
C7	@IF(rate=0,0,@IF(prin=0,0, @IF(term=0,0,@PMT(prin,rate,term))))
D3	@IF(rate=0,0,@IF(prin=0,0, @IF(term=0,0,prin*(1+rate)^term)))
D4	@IF(payt=0,0,@IF(rate=0,0, @IF(prin=0,0,@ABS(@TERM(payt, rate,-prin)))))
D5	@IF(rate=0,0,@IF(fv=0,0, @IF(term=0,0,(fv/(1+rate)^term))))
D7	@IF(fv=0,0,@IF(rate=0,0, @IF(term=0,0,(fv/(1+rate)^term) *(rate/(1-(rate+1)^-term)))))

6. Save the file

Avoid the budgeting crisis

with The New Commander™ for Budgeting

No matter how well you plan, or how hard you work, you'll always face problems during the budgeting process. You can't eliminate them, but you can choose the one system that lets you solve them quickly—before they become a crisis:
The New Commander for Budgeting.

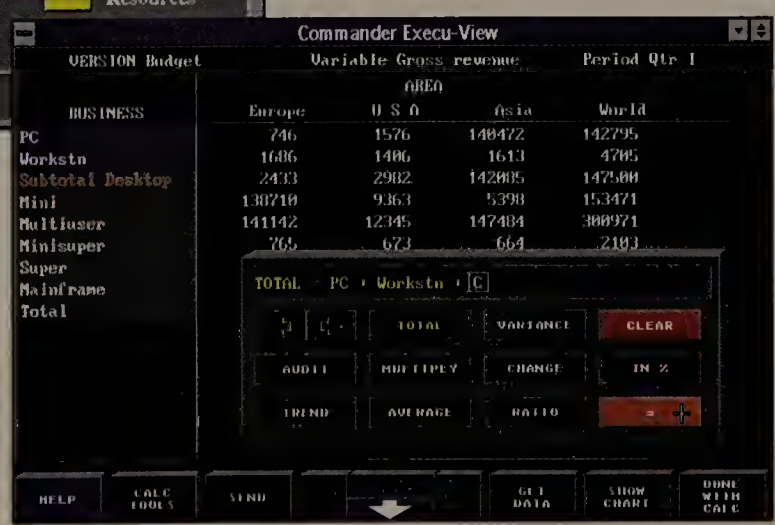


The Crisis of Change

At any time during the annual budgeting process you may need to restate the budget to reflect changes—a re-organization, a new acquisition or divestiture, new allocation rules. The New Commander for Budgeting meets this challenge with features and flexibility that can quickly provide a revised budget while maintaining complete integrity of the system.

Staying in Control

Only Commander gives you the capabilities to manage the entire budgeting process—from electronically distributing templates, instructions and guidelines to intelligently monitoring the status of budgets submitted from departments and divisions around the world. For once you'll have a tool to keep the process on schedule, to quickly identify areas needing attention, and to test the "reasonableness" of complex, interrelated budgets.



Reporting From Every Angle

There's no way to anticipate all the different requests for budget reports. But the New Commander, with its multidimensional consolidation, analysis, and reporting capabilities, makes it easy to respond with budget reports from any perspective, without extraordinary effort or anxiety about the integrity of the data.

See for yourself...

For a copy of a white paper on *Management-Based Budgeting*, and our video, *Delivering Managerial Applications Today*, call Chris Kelly at **1-800-922-7979**, Canada: 1-800-541-1780, or 313-994-4800

COMSHARE®
Specializing in Managerial Applications™

© 1992, Comshare, Inc. Commander is a trademark of Comshare, Inc. C92-6B

For free product information, circle 85 on the reader service card on page 311

Turn Your Worksheet Into a Team Player

Release 4.0's Version Manager makes it dramatically easier to collaborate with others on a budget plan—within a single worksheet.

BY RICHARD CRANFORD

It's budget time, and the worksheets are flying through your organization. Think about the hours you and your weary co-workers spend copying or retyping data between worksheets. Does anyone in the organization really know all the assumptions behind those worksheets?

Fortunately, when worksheets need to be shared, 1-2-3 release 4.0's Version Manager provides a solution.

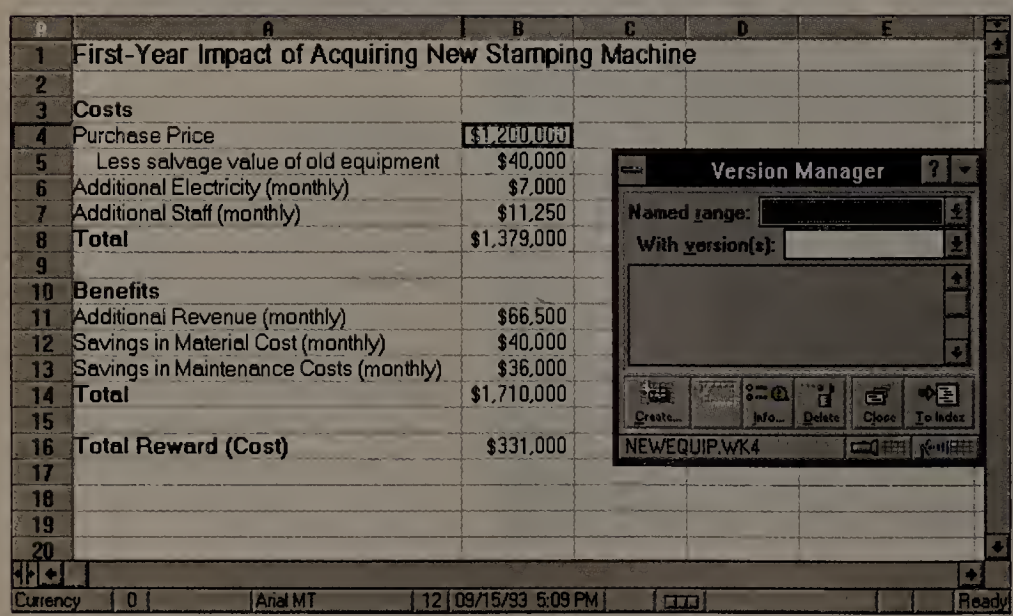


FIGURE 1: TO ADD YOUR ESTIMATES to a worksheet using release 4.0, select Range • Version, then click the Create button in the resulting dialog box.

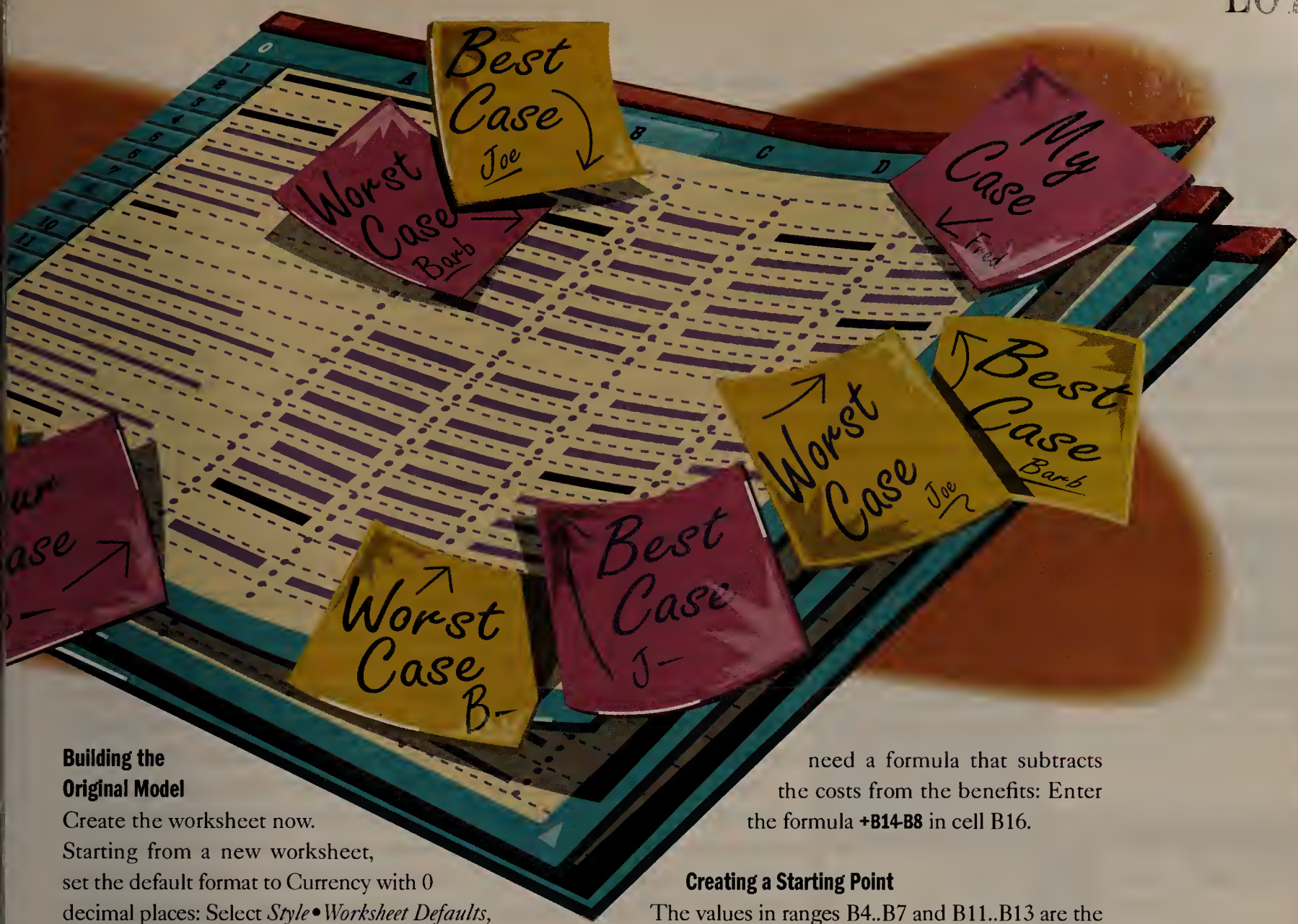
Version Manager lets you store several possible combinations of values for a range (*versions*), as well as several possible combinations of combinations (*scenarios*), in one worksheet. You can then call up any permutation in a jiffy and see how it affects the results.

To see how Version Manager can be useful, consider a hypothetical business example. The Hauzingwest Company makes molded plastic shears that are popular with cooks because they do such a great job of cutting pastry dough. They're so popular, in fact, that Hauzingwest can't satisfy the demand. Both halves of the shears are produced by a Meac model 2000 stamping machine, then assembled by hand.

Management suspects that Hauzingwest might boost profits by acquiring a Meac 4000 stamping machine to replace the model 2000. The 4000 can produce the shears at a faster rate, which should lead to increased sales revenue. And Meac boasts that the 4000 is more reliable, wastes less plastic, and requires less maintenance than Hauzingwest's old model 2000. (Some of Hauzingwest's managers dispute Meac's claims.) Then again, the 4000 runs up a higher electrical bill than the 2000.

Besides considering the costs of acquiring and powering the machine, Hauzingwest must take into account the expense of hiring additional staff for post-stamping assembly. Consequently, the real costs and benefits of getting a new stamping machine—and thus its impact on Hauzingwest's fortunes—are subject to debate. The president of the company appoints a project team to assess the claims and counterclaims and to calculate the probable costs for the first year of operation of upgrading the stamping machine. The team's initial findings appear in the worksheet in **FIGURE 1**.

WAYNE VINCENT



Building the Original Model

Create the worksheet now. Starting from a new worksheet, set the default format to Currency with 0 decimal places: Select *Style•Worksheet Defaults*, select *Currency* in the Format pulldown list, type a **0** in the Decimals box, and click *OK*. Enter the labels in range A3..A16, and assign the bold attribute to cells A3, A8, A10, A14, and A16 by highlighting the cell and clicking the Bold SmartIcon. (Begin the label in cell A5 with five spaces.) When you've entered these labels, double-click the right side of the column A segment in the worksheet frame (this makes column A a few characters wider than the longest label you entered). Then enter the label shown in cell A1, assign it a slightly larger font by selecting from the font pop-up menu on the status bar at the bottom of the screen, and assign it the bold attribute.

The next step is to enter the numbers in ranges B4..B7 and B11..B13. Assign two range names: costs and benefits. Select *Range•Name*, type **costs** in the Name box, type **B4..B7** in the Range box, and click *Add*. Then type **benefits** and **B11..B13** in the boxes, click *Add*, and click *OK*. Enter the formula **+B4-B5+B6*12+B7*12** in cell B8. This formula tells 1-2-3 to subtract the salvage value of the old stamping machine from the purchase price of the new machine, then multiply the monthly cost of additional electricity and staff by 12 and add these products to the adjusted purchase price. Enter the formula **@SUM(B11..B13)*12** in cell B14. Finally, we need a formula that subtracts the costs from the benefits: Enter the formula **+B14-B8** in cell B16.

Creating a Starting Point

The values in ranges B4..B7 and B11..B13 are the project team's versions of the costs and benefits of investing in the new equipment. Taken together, the contents of the two ranges make up a scenario. Before we make this worksheet available so that others can enter their estimates of the costs and benefits of the venture, we'll record the values shown in Figure 1 as the team's estimates.

Put the cell pointer on cell B4 and select *Range•Version* to open the Version Manager dialog box. If the title bar of the dialog box says 'Version Manager Index', click the *To Manager* button. If necessary, make the window taller so the text box is visible below the With Version(s) box. To make this adjustment, move the mouse pointer to the center of the bottom edge and drag it down a bit. If the Version Manager dialog box hides worksheet data, move the mouse pointer to its title bar and drag the box to the right side of the screen.

Unlike the dialog boxes that accompany many other 1-2-3 operations, the Version Manager dialog box in release 4.0 stays in place while you make adjustments to the worksheet. You can switch back and forth between the worksheet window and the Version Manager window by clicking in the desired window with the mouse or by pressing **<Alt>-<F6>**.

Click the *Create* button in the Version Manager win-

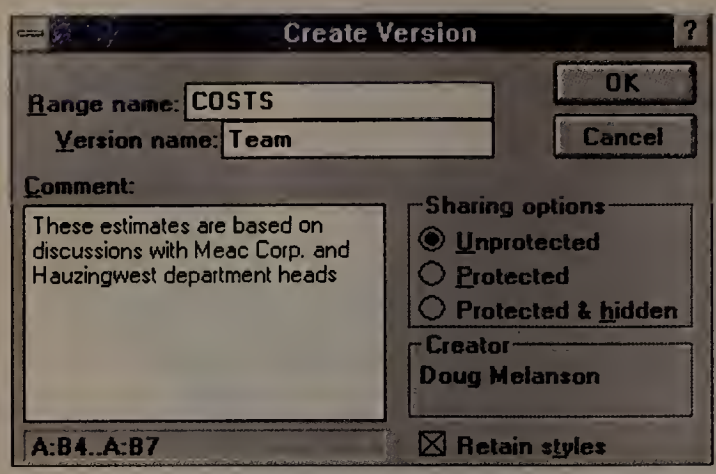


FIGURE 2: THE CREATE VERSION dialog box allows you to assign a meaningful name to your version of the data and to explain the bases for your estimates.

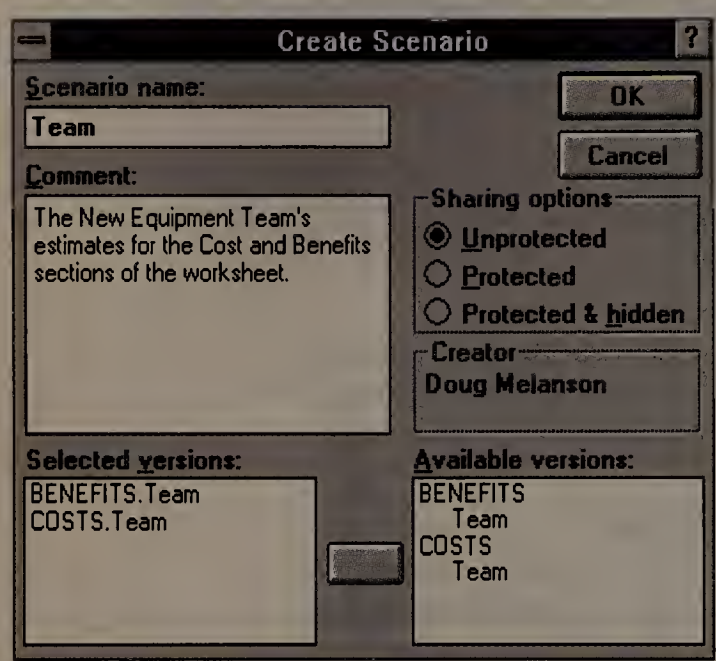


FIGURE 3: THE CREATE SCENARIO box lets you group versions of different named ranges into scenarios.

dow to call up the Create Version dialog box. Because you selected a cell in the Costs range before you called the Version Manager, the range name already appears in the Range name box, as shown in **FIGURE 2**. Type **Team** in the Version name box. If you try to create a version for an unnamed range, 1-2-3 will automatically assign the label that appears to the left of the current cell as the name for that range, or it will place the default name, Range1, in the Range name box.

Keep in mind that Version Manager lets you assign the same version name to the same range twice. As you adjust ranges and create new versions, be careful not to duplicate names.

Type **These estimates are based on discussions with Meac Corporation and Hauzingwest department heads** in the text box and click *OK*. The annotation you provide tells others why you created this version of the worksheet. The With Version(s) box in the Version Manager dialog box now shows the version name, 'Team'.

Next assign a version name to the range of benefits. Click cell B11, then click the *Create* button, type **Team** in the Version name box, type **Team's original estimate of benefits** in the Comments box, and click *OK*. If it seems as though you've used the name Team redundantly, keep in mind that you've assigned it to different range names.

You can now fiddle with the values in either named range and then set the range back to its original state. Instructions on how to accomplish that follow. First, let's make it possible to set the two ranges back to their initial states at once, by grouping the versions into a named scenario.

You must switch to the Version Manager Index to create a scenario, so click the *To Index* button. If the wide button below the title bar on the left side of the window does not read 'Contributor name sort', click the button and select *Contributor name* from the pull-down list. The index should show your name followed by the version names ('BENEFITS. Team' and 'COSTS.Team'), the dates the versions were created, and your comments. You may have to widen the Index to view all its information. If the versions don't appear after your name, click the button with the stripes on the left side of the box. Select all the versions created by the team: Either hold the mouse button and drag the pointer down the list of version names, or hold **<Shift>** and press **<Cursor Down>**, until all the versions are highlighted. Then click *Scenario* to pop up another dialog box, as shown in **FIGURE 3**. Type the name **Team** in the Scenario name box along with a description in the Comments box and click *OK*.

Click the *To Manager* button to switch from the Index window to the Manager window. Then click *File* in 1-2-3's menu bar, select *Save*, and enter a name for this worksheet file.

Everyone Has an Opinion

Now we're ready to distribute the worksheet to other Hauzingwest department heads to see how their estimates of the effects of getting a new stamping machine affect the potential benefit. We can distribute the worksheet via sneaker-net (that is, by copying it onto one or several disks and passing these among the department heads) or via a network.

When you distribute a worksheet over the network using E-mail, users add their versions and assumptions to their copy of the worksheet, then mail that updated copy back to a central user. That person then uses Version Manager to merge incoming versions and scenarios into a master file. When you store a file to a shared network directory, multiple users add their versions and scenarios to the same file, but not simultaneously. A worksheet shared within Lotus Notes can be modified by several users simultaneously (see "Sharing 'Versioned' Worksheets in Notes").

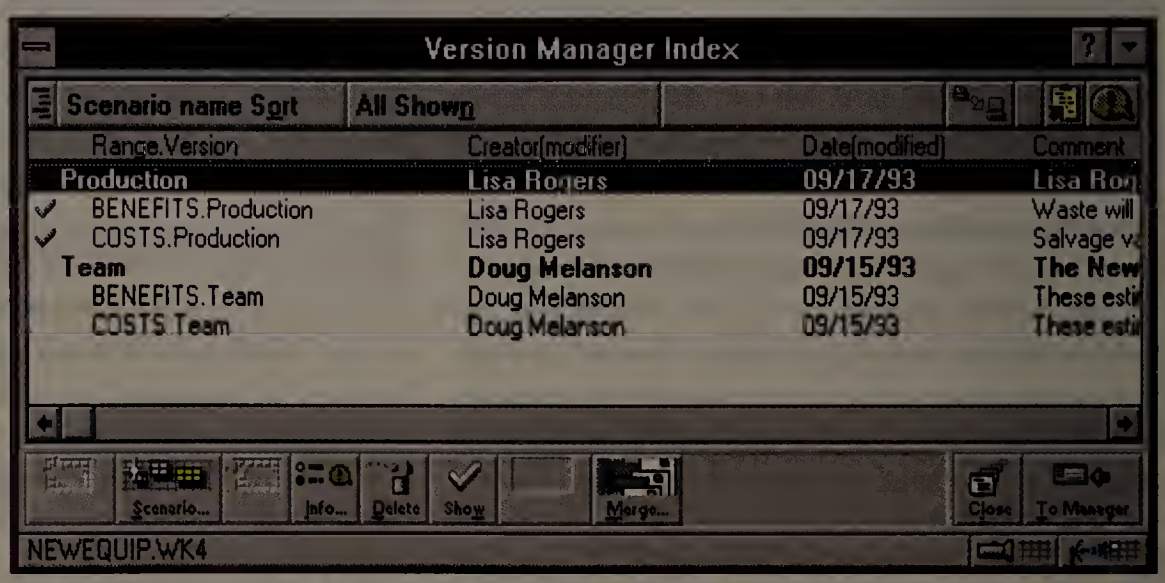


FIGURE 4: THE VERSION MANAGER INDEX lets you view information about all the versions in a file. The check marks indicate that the Production scenario is current.

Let's say that the first person to look at the model is the production manager. She has no objection to the committee's estimates for the price of the new stamper or cost of additional staff. She doubts, though, that Hauzingwest could get $40,000 for its breakdown-prone model 2000, and that it will cost an additional $7000 each month to run the model 4000.

Assume that you're the production manager. Enter **20000** and **5000** in cells B5 and B6. The Version Manager window now shows that some of the values in the Team version have changed: There's a line through the check mark and Team is now italicized. That's okay, because we're about to turn these numbers into a new version. Click the *Create* button, type **Production** in the Version Name box, type in a comment, and click *OK*. The Version Manager window now indicates that the range named Costs contains Production's estimates.

Just as you select versions to exchange sets of values in a range, you can select scenarios to exchange sets of versions.

Here's where Version Manager begins to earn its keep. You've changed two of the cells in the Costs range, but you can instantly recall the committee's estimates by selecting *Team* from the With Version list. You can just as easily bring back Production's estimates. Switching back and forth between the two versions while keeping an eye on cell B16 lets you see how they each affect the model's final result. (Unfortunately, you can't view both on screen at the same time.)

Let's assume further that the production manager thinks the model 4000 won't significantly cut down on material costs. Enter **25000** in cell B12 and create a version named **Production** for the Benefits range. Now click *To Index*. Click the button marked *Scenario Name Sort* and select *Version Name* from the drop-down list. This lists the two version names you've created, each followed by the two ranges to which they're assigned. Select both of the range names under 'Production', then click the *Scenario* button. Assign the name **Production** to this scenario, type in a comment, and click *OK*. When the index returns, the versions are sorted by scenario name again. Each scenario is followed by the versions it includes, as in **FIGURE 4**. If you only want to see the scenario names, click the button with the stripes on the left side of the box.

The worksheet now has two scenarios. One reflects the team's idea of what will happen if the company acquires the new stamping machine; one reflects the production manager's. Just as you selected versions to exchange one set of values in a range for another, you can select scenarios to exchange one set of versions for another.

See for yourself. First move the dialog box so that cell B16 is visible. Double-click *Production*, then double-click *Team* to see how the two sets of estimates affect the end result. Save the worksheet again. If you wish, create more versions and scenarios to reflect how other department heads—marketing, human resources, purchasing—might vary the estimates.

Versions that make up a scenario don't have to come from the same department. Version Manager lets you mix and match versions to create even more scenarios. After looking at the department heads' versions of the worksheet, you may decide to create a scenario that uses Production's version of the Costs range and Marketing's version of the Benefits range. Sort the Version Manager Index by range name, double-click the version you want for each range, and click *Scenario* to create a new scenario.

With release 4.0's Version Manager, what used to require a lot of retyping and a trail of worksheets can be contained in one file—and you know exactly who did what, when, and why.

Richard Cranford is a senior associate editor for PC World Lotus Edition *and editor of* The 1-2-3 for Windows Report.

Sharing "Versioned" Worksheets in Notes

If your company has Lotus Notes, you can give everyone in your group access to a worksheet by saving it as a shared file on a Notes server. The advantage of a shared file, versus a WK4 file saved to a shared network directory, is that it can be updated by several users simultaneously. If a user creates a version or scenario and another user is working with the shared file, the second user's computer beeps and 1-2-3 displays the message 'New versions have been posted' in the worksheet's title bar. Clicking the Refresh button in the Version Manager dialog box lets the second user see the new versions or scenarios.

In contrast, when you store a worksheet on a network, only the first user to open the file is able to modify and save it. Subsequent users open the file in read-only mode and can't save changes unless the first user releases the reservation or closes the file.

Before storing a worksheet on a Notes server, you must unprotect all the ranges in which you want people to add or modify versions. Select the first range by dragging the mouse pointer over it. Select additional ranges by holding <Ctrl> and dragging the pointer over them. Then select *Style • Protection*, click the box marked 'Keep data unprotected after file is sealed', and click *OK*. Select *File • Save As*. Enter a new name in the File Name text box (unless you want to use the existing name and change the WK4 extension to NS4). Click the arrow next to the File Type box and select *Shared (NS4)* from the drop-down list. When you do this, the word 'Drives' above the drop-down list to its right changes to 'Servers'. Select the appropriate server from this list and click *OK*. A dialog box appears, letting you enter and verify a password for the shared file.

Now you and other users on your Notes server can open the worksheet and add or update versions. To open the shared file, select *File • Open*, select *Shared (NS4)* from the File Type drop-down list, select the appropriate Notes server, select the file from the File Name list, and click *OK*. After you've incorporated your changes, resave the file as a shared file by selecting *File • Save*.

Spreadsheet Auditing Made Easy

Have you inherited a worksheet whose calculations just don't make sense? Been baffled by the intricacies of a worksheet you designed years ago, then put aside? If so, 1-2-3's Auditor can help.

Auditor is an add-in that comes with 1-2-3 releases 2.3, 2.4, 3.1+, and 3.4 and is a built-in function in 1-2-3 release 4.0 for Windows. It analyzes your worksheet by finding and highlighting all the formulas, tracing the relationships between formulas and data, and pinpointing certain formula errors. In this article, we'll discuss Auditor's main functions and show how they can help you understand your worksheet's logic.

Load and Go

If you installed the complete 1-2-3 package, you installed Auditor automatically. You can check whether Auditor is installed by attempting to attach it.

If you're using 1-2-3 release 2.3 or 2.4, select */Add-In•Attach* and select the file *AUDITOR.ADN*. Attach it to a function key (assign it to <Alt>-<F8> by selecting *8* if it isn't already assigned). Select *Quit* to return to Ready mode.

If you are using release 3.1+ or 3.4, press **<Alt>-<F10>**. Choose *Load* and select the file *AUDITOR.PLC*. Then select *2* to assign it to the <Alt>-<F8> key combination, and select *Quit*.

If Auditor doesn't appear on your add-in menu, install Auditor from your original 1-2-3 installation disks.

In release 4.0, select *Tools•Audit*. This brings up the dialog box shown in **FIGURE 1**. Release 4.0's Auditor is slightly different from Auditor in releases 2.*x* and 3.*x*. Although this article gives you the keystroke commands for the DOS releases, you'll find it easy to follow along in release 4.0. There are two differences you'll want to note. First, release 4.0 does not have a Trace option. It shows you all the cells in the audit at once. Second, you can audit the current file or all active files, but you cannot specify a particular range to audit.

FIGURE 2 shows a sample worksheet with some built-in errors that we'll use to show auditing techniques. To build the worksheet in Figure 2, enter the labels in row 1 and in column A. Center the labels in row 1 by preceding each one with a caret (^). To right-align the labels in cells A6, A12, and A14, precede them with a quotation mark ("). Next, select */Worksheet•Global•Format*, select *Currency*, and enter **0** decimal places. Then enter the values in ranges B2..D4 and B8..D10 of Figure 2.

Next, enter the formula **@SUM(B2..B4)** into cell B6 and copy it to ranges C6..D6 and B12..D12. Enter **@SUM(B2..D2)** into cell E2 and copy it to ranges E3..E4 and E8..E10. In cell B14, enter **+B6+B12** and copy it to range C14..D14, and in cell E14, enter **+E6+E12**.

Finally, enter the formula **@SUM(E2..E6)** into cell E6 and copy it to cell E12. This last formula creates two circular references that Auditor will pinpoint. Because of the circular references, the results in cells E6, E12, and E14 may not match the figures. Save the file.

With Auditor attached, press **<Alt>-<F8>**. The Auditor main menu appears, along with the Auditor settings sheet. Your worksheet should resemble the one in **FIGURE 3** (release 2.*x*) or **FIGURE 4** (release 3.*x*).

The Auditor Settings section at the top of your screen indicates that 1-2-3 will audit range A1..IV8192 in release 2.*x* or all files in memory in release 3.*x*. You can change this by selecting *Options•Audit-Range* and specifying the range or files you want Auditor to work on. When you open additional files in release 3.*x*, Auditor extends the audit range to include all files in memory. You cannot use the Options•Audit-Range command to extend the audit range across multiple active files.

Find Precedent Cells

Say you want to use Auditor to explore the cells used by the formula in cell B14 of Figure 2. To find the precedent cells—the cells that the formula uses in its calculations—first make sure the Highlight setting appears in the settings sheet. The Highlight setting means that Auditor will highlight the precedent cells it finds. Choose *Precedents*, specify cell B14, then choose *Quit*. The color and shading of all entries above row 14 in column B will change, indicating that they are the cells the formula in B14 uses in its calculations.

The highlights tell us that the formula in cell B14 (+B6+B12) depends on cells B2, B3, B4, B6, B8, B9, B10, and

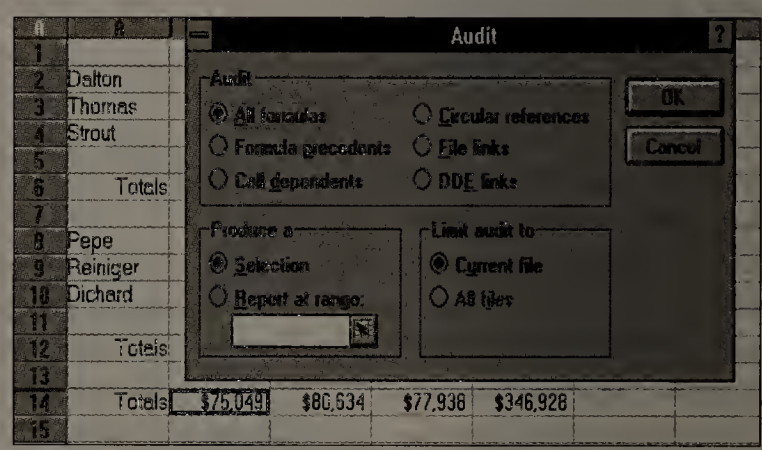


FIGURE 1: AUDITING IS BUILT INTO RELEASE 4.0. You specify all settings in a single dialog box.

PETER HOEY

B12. But which of these cells contain additional formulas? The next technique shows you how to find out.

Highlight the Formulas

Before you track down the formula cells, clear the highlighted cells. Otherwise, there will be no easy way to distinguish the formula cells from the data cells. To clear the highlights, press **<Alt>-<F8>** to activate Auditor's menu, then select *Options•Reset•Highlight*. Now select *Audit-Range* and specify range B1..B14. Select *Quit* to return to Auditor's main menu.

Now select *Formulas*, and Auditor illuminates the formula cells in the audit range B1..B14. Choose *Quit* if you want to view all the spreadsheet's formula cells. Auditor reveals that formulas exist in cells B6, B12, and B14 of audit range B1..B14.

Trace Rather Than Highlight

The Trace option lets you follow a cell's precedents or dependents. To further analyze our sample worksheet, we'll trace its dependents, which are the formulas that use a specific cell in their calculations. Press **<Alt>-<F8>**, and then select *Options•Reset•Highlight* from Auditor's main menu. Next, select *Audit-Range* and specify range A1..E14. Choose *Trace* and then *Quit*. Pick *Dependents* and indicate cell C2 as the cell whose dependents you wish to find.

Auditor immediately moves the cell pointer to cell E2 and displays a menu with three options: Forward, Backward, and Quit. The formula in the control panel tells you how C2 relates to cell E2: Cell C2 is used in @SUM (B2..D2). Now select *Forward*, and the cell pointer hops to cell C6. The formula in cell C6 also depends on cell C2 because cell C6 contains the formula @SUM (C2..C4). Select *Forward* repeatedly and follow the progress of the trace through the dependent formula cells. To return to the main Auditor menu, choose *Quit*.

	July	August	September	Totals
Dalton	$12,789	$11,342	$11,540	$35,671
Thomas	$11,232	$14,525	$12,137	$37,894
Strout	$11,426	$15,272	$13,044	$39,742
Totals	$35,447	$41,139	$36,721	$226,614
Pepe	$13,906	$12,877	$13,876	$40,659
Reiniger	$12,789	$14,564	$14,564	$41,917
Dichard	$12,907	$12,054	$12,777	$37,738
Totals	$39,602	$39,495	$41,217	$120,314
Totals	$75,049	$80,634	$77,938	$346,928

FIGURE 2: BUILD THIS WORKSHEET TO LEARN how Auditor exposes logical errors.

List Circular References

If you've ever created a formula with a circular reference, you've seen the dreaded CIRC indicator appear at the bottom of the display. A formula with a circular reference refers directly or indirectly to itself. Auditor pinpoints the formula error that produces a circular reference. Choose *Options•List*, select *Quit* to return to the main Auditor menu, and choose *Circs*. Auditor asks where you want the list to appear. Select a blank area of the worksheet, in this case cell G1. (Auditor protects your data by preventing you from specifying a range that already contains entries.)

Auditor displays the two cells that are connected to the circular path: cells E6 and E12. Release 2.*x* shows a full screen list automatically. If you're working in release 3.*x*, press **<F3>** to see a full-screen list. Choose cell E6 as the beginning cell, then select *Quit* to view the results.

The message 'Circular Path E6 == E6' appears in cell G1, and the message 'E6: (CIRC) @SUM(E2..E6)' appears in cell G2. When more than one formula has a circular reference, Auditor lists them all and shows how they relate to each other so you can eradicate the problem quickly.

The entry in cell G2 tells us that the formula in cell E6, @SUM (E2..E6), contains a circular reference. Change the formula so that it reads @SUM(E2..E4), then copy it to cell E12. The CIRC indicator disappears, and the formulas evaluate correctly. Keep in mind that in release 3.*x*, the Circs command finds circular references in all files in memory, even though you may have specified a narrower audit range.

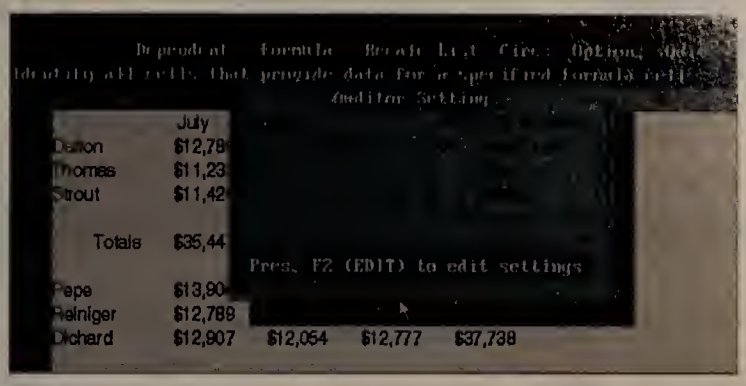


FIGURE 3: IN RELEASE 2.X, Auditor presents you with its own menu and settings sheet.

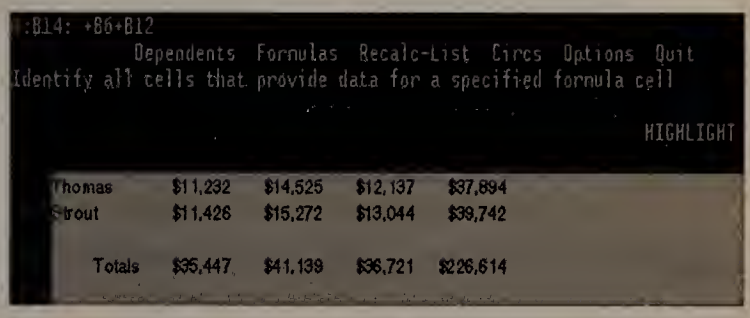


FIGURE 4: RELEASE 3.X'S AUDITOR LOOKS DIFFERENT from release 2.x's, but it performs similar auditing functions.

If Your Worksheet Is Protected

If you have protected your worksheet and unprotected some cells, they will appear in the same color or with the same highlighting as the cells highlighted by Auditor. Your worksheet will retain the status of any cells that you protected and unprotected before auditing, but seeing both sets of cells highlighted might be confusing.

Before using Auditor, save your file with the protect/unprotect scheme intact. Then use the Range•Prot command to reset the unprotected cells. If you've enabled worksheet protection, select */Worksheet•Global•Prot•Disable*. Then work with Auditor to uncover your model's logic.

By Daniel Gasteiger

Daniel Gasteiger is a consultant and coeditor of The Spreadsheet Consultant, *published by Gasteiger & Delonas Inc. in Boston.*

Getting Started With Release 4.0 Databases

If you've got 1-2-3 release 4.0 for Windows, you may not need a dedicated database management package, but you may need a tour of the new database features. As in earlier versions of 1-2-3, entering and editing data is easy because you stay in the familiar spreadsheet environment. To create a database, just enter a row of field names and enter the database records below those field names, one record per row. But analyzing the database is easier in release 4.0 because you specify all database elements in dialog boxes. Here are some tips for using release 4.0 effectively as a database management tool.

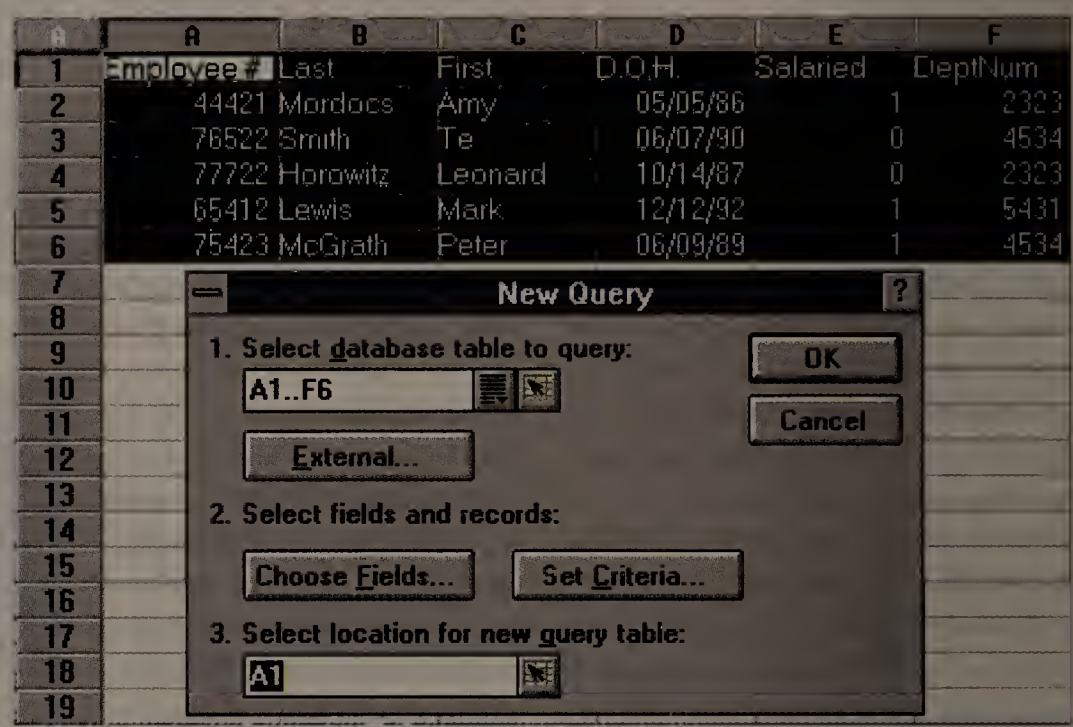


FIGURE 1: USE THE DATABASE IN RANGE A1..F6 to test the new database features in release 4.0. The New Query command gives you a dialog box for setting criteria.

❶ Use the Fit-largest-entry feature to widen or narrow columns when perusing your database. Sometimes the fastest way to find information is to scan the database table itself. You can make this task easier by ensuring that the columns are wide enough to display database entries in their entirety. Although not limited to database use, 1-2-3's new fit-largest feature makes it easier to view your records.

For each column in the database table, move the mouse to the right border of the box that contains the column letter. The mouse pointer changes to a black, two-headed horizontal arrow. Then double-click the left mouse button. 1-2-3 automatically adjusts the width of the column to accommodate the longest entry. To adjust the width of a group of columns, preselect the columns, select *Style•Column Width*, click on *Fit widest entry*, and click *OK*.

❷ Specify criteria in dialog boxes. Instead of creating criteria and output ranges, as in earlier releases, you specify all database elements in dialog boxes. For example, suppose you have an employee database like the one shown in **FIGURE 1** and you want to extract the records of all salaried employees, where Salaried = 1.

First select *Tools•Database•New Query*. The New Query dialog box appears. Specify the database range as A1..F6. If you preselected the database range, its address appears in the first item of the dialog box.

Next tell 1-2-3 which records in this range to select. To specify the selection criterion, click the *Set Criteria* button and select the appropriate field, operator, and value by clicking on the down-arrow in the right corner of each drop-down box and making your selection.

For example, to extract all salaried employees (where Salaried = 1), click the Field down-arrow and select *Salaried* from the list of field names. Because the Operator is set to 'equals' and the first value in the Salaried field of the database is 1, the Criteria formula is complete (see **FIGURE 2**). Click *OK* to return to the New Query dialog box.

Now you need to specify a blank range or the top-left cell of a blank range where the new query table will be placed. A query table contains the results of your database record selection defined by the criteria you specify. Make sure the location for the new query table is large enough to hold all the extracted data. If the area isn't large enough, the command will overwrite cell contents below it. Select cell A10 for the location of the new query table and click *OK*. The data records for Mordocs, Lewis, and McGrath will appear in range A11..F13 below the field names in row 10.

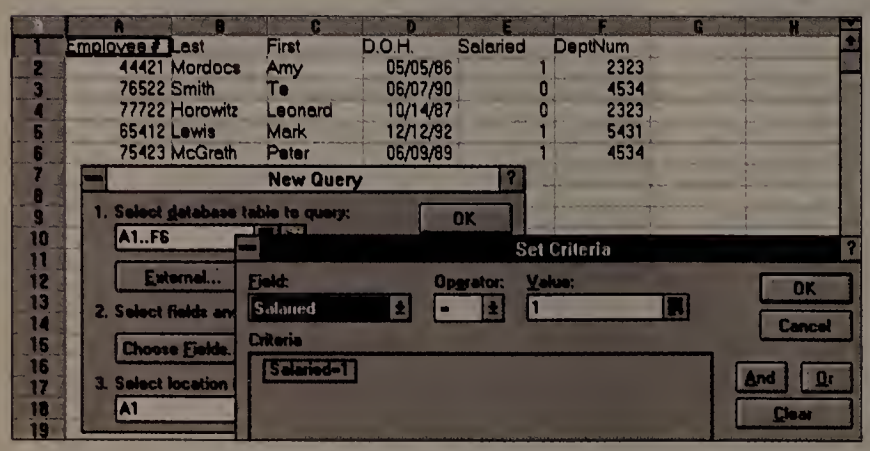
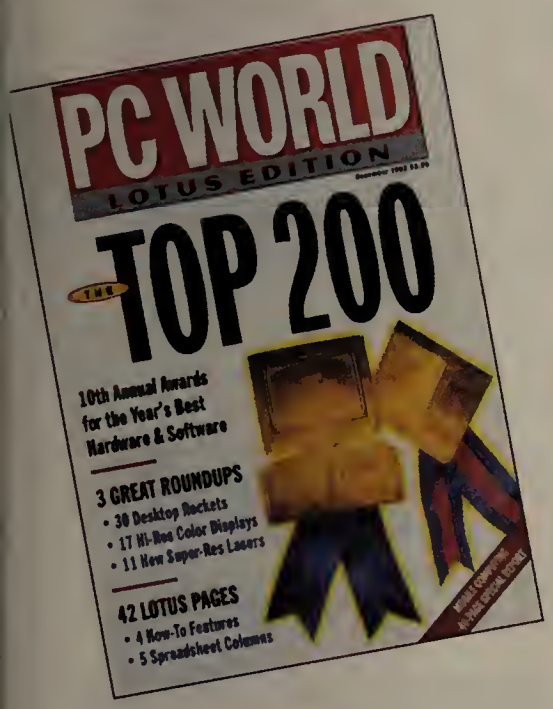


FIGURE 2: QUERYING YOUR DATABASE IS EASIER IN RELEASE 4.0. We've used the pull-down edit boxes in the Set Criteria dialog box to tell 1-2-3 to extract all records in which Salaried = 1.

❸ Drag criterion statements to different positions to change their relationships. Once you have more than one criterion statement in place, you can change the relationship between the statements from OR to AND, or vice versa, simply

INTRODUCING

PC WORLD
LOTUS EDITION



Subscribe today and get the best of both worlds – **PC WORLD**, known for its great coverage of cutting-edge PC technology, along with a special **LOTUS section.** You'll get the same practical tips, ready-to-use applications and macro how-tos that you're used to seeing in LOTUS magazine. Together, they're guaranteed to help you maximize your productivity and business creativity.

Recycled Paper

SUPER SAVINGS!

YES! ☑ Please enter my subscription to the special **PC WORLD LOTUS EDITION** and bill me at the special rate of only $19.97 for 12 monthly issues – 58% off the newsstand rate, just $1.67 an issue.

Mail this card or call 800-825-7595 X501 • Fax: 415-882-0936

Name _____

Company _____

Address _____

City, State, Zip _____

PC WORLD
LOTUS EDITION

Please allow 6 to 8 weeks for delivery of your first issue. Offer good only in the U.S. 42C09

SUPER SAVINGS!

YES! ☑ Please enter my subscription to the special PC WORLD LOTUS EDITION and bill me at the special rate of only $19.97 for 12 monthly issues – 58% off the newsstand rate, just $1.67 an issue.

Mail this card or call 800-825-7595 X501 • Fax: 415-882-0936

Name _____

Company _____

Address _____

City, State, Zip _____

PC WORLD
LOTUS EDITION

Please allow 6 to 8 weeks for delivery of your first issue. Offer good only in the U.S. 42C09

SUPER SAVINGS!

YES! ☑ Please enter my subscription to the special PC WORLD LOTUS EDITION and bill me at the special rate of only $19.97 for 12 monthly issues – 58% off the newsstand rate, just $1.67 an issue.

Mail this card or call 800-825-7595 X501 • Fax: 415-882-0936

Name _____

Company _____

Address _____

City, State, Zip _____

PC WORLD
LOTUS EDITION

Please allow 6 to 8 weeks for delivery of your first issue. Offer good only in the U.S. 42C09

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World Lotus Edition
Subscription Department
P.O. Box 55011
Boulder, Colorado 80321-5011

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World Lotus Edition
Subscription Department
P.O. Box 55011
Boulder, Colorado 80321-5011

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World Lotus Edition
Subscription Department
P.O. Box 55011
Boulder, Colorado 80321-5011

SUBSCRIBE TODAY!

by dragging the statements around the Criteria box. Two conditions on the same line have an OR relationship, which means 1-2-3 will select all records that meet either condition you've specified. Drag the second criterion on top of the first, and the criteria logic changes to an AND relationship, which means 1-2-3 will select all records that meet both conditions. To change it to an OR relationship, drag the second criterion back to its original position. You can also use the And and Or buttons to define criteria.

To create complex criteria such as "Retrieve all employees who are in department 2323 OR in department 4534," click the *Or* button to add the second test to the Criteria box. Click on any cell to deselect the query table created in the previous tip, then preselect range A1..F6. Select *Tools•Database•New Query* and click on the *Set Criteria* button. Specify **DeptNum** in the Field box. The Criteria box now shows 'DeptNum=2323'. Click the *Or* button, select *4534* from the Value box, and click *OK*. Specify cell A15 as the location of this query table and click *OK*. Range A16..F19 now contains records for Mordocs, Smith, Horowitz, and McGrath, as shown in **FIGURE 3**.

	A	B	C	D	E	F
15	Employee #	Last	First	D.O.H.	Salaried	DeptNum
16	44401	Mordocs	Amy	05/05/86	1	2323
17	70502	Smith	Te	06/07/90	0	4534
18	77722	Horowitz	Leonard	10/14/87	0	2323
19	75403	McGrath	Peter	06/09/89	1	4534
20						

FIGURE 3: THE QUERY TABLE located in range A15..F19 contains those records in which DeptNum equals 2323 or 4534.

4 Use field names instead of offset numbers in @D functions. Even if you already know how to use @D functions, release 4.0 has some new capabilities that are worth noting. Forget counting over from the first database column to figure out the offset number of the field. Now you can enter the name of the field you want to calculate, enclosed in quotes, directly into the function.

Consider the database in Figure 1. Suppose you want to count the number of records in which DeptNum equals 2323. In earlier releases of 1-2-3, you would use the @D function @DCOUNT(Db,5,Crit), where Db is the range name of the database including field names, 5 is the offset number of the DeptNum column, and Crit is the name of a criteria range, which contains the field name 'DeptNum' and the value you want to match, '2323', below the field name. In release 4.0, however, you don't have to worry about the location of the field; you simply enter its name directly into the formula. You would use the following formula to count the number of database records where DeptNum equals 2323: **@DCOUNT(Db,"DeptNum",Crit)**.

5 Specify the criteria test in the @D function. In earlier releases of 1-2-3 you also have to set up a separate criteria range for each @D function test. In release 4.0, you specify the selection criterion right in the @D function. Consider the formula just used to count employees in department number 2323. The last argument in the formula, 'Crit', is the name of a criteria range that contains the field name 'DeptNum' and the value you want to match, '2323'. In release 4.0, you can specify the selection criterion by placing it in the formula: **@DCOUNT(Db,"DeptNum", DeptNum=2323)**.

6 Change groups of data with the Query Table command. One way to change the contents of a large database is to use a query table. Suppose your company consolidated departments 2323 and 4534 into a new department, 5000. Rather than going through the database and changing the records manually, let 1-2-3 do the work for you. Just create a query table that lists all records with a department number of either 2323 or 4534, modify the records there, and tell 1-2-3 to put them back into the database table.

First, you need to create a query table (we've already created it in Tip 3). Now look at the menu bar. As you can see, the Range command that appears in the menu bar has been temporarily replaced with the Query command. The Query command appears in the menu bar whenever a query table is selected.

Analyzing your 1-2-3 database is easier in release 4.0 because you specify all of the database elements in dialog boxes.

If this isn't the case, click on any cell in the query table (range A15..F19). With range A15..F19 preselected, select *Query•Set Options*, check the *Allow Updates to Source Table* box, and click *OK*. Now change the query table by entering **5000** for the department number in cell F16 and copying that value to range F17..F19.

When you've finished editing the query table, click on any cell in the query table and choose *Query•Update Database Table*. Release 4.0 automatically changes all records with department numbers of 2323 or 4534 to department number 5000 in the original database table that resides in range A1..F6. To finish the process, delete the field names that are left in row 15.

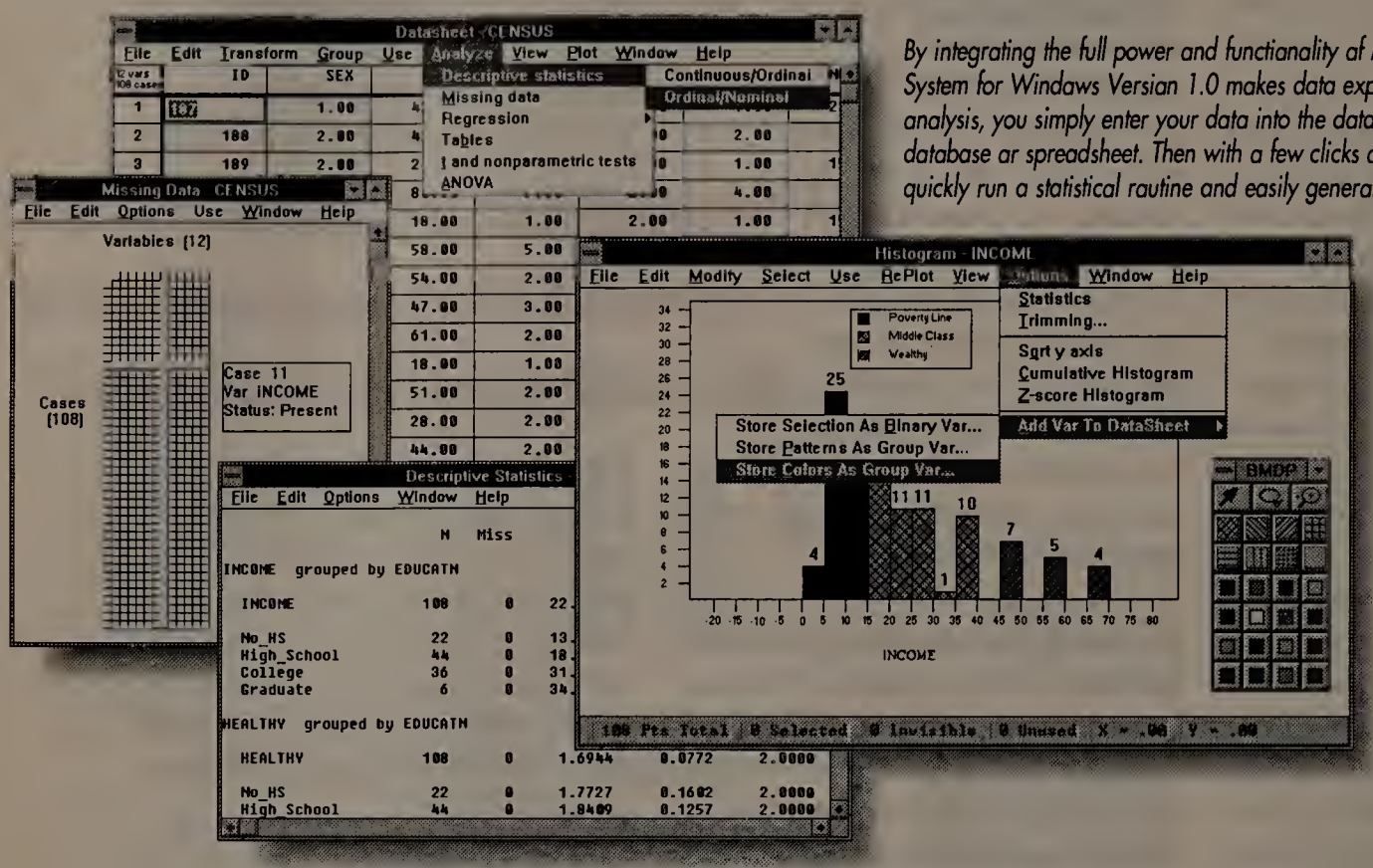
7 Use @functions and formulas in your criteria tests. Though 1-2-3 lists the field contents in the Value drop-down box of the Set Criteria dialog box, you can use formulas or @functions. Suppose your database includes the fields Net and Bonus (which contain values for compensation and bonus) and you want to extract the records of all employees who received a 10 percent bonus last year. You would select *Bonus* from the Field box and enter the formula **+Net*0.1** in the Value box. The criteria 'Bonus=+ Net* 0.1' would appear in the Criteria box.

By Nicholas Delonas

Nicholas Delonas is a software consultant and coeditor of The Spreadsheet Consultant, *published by Gasteiger & Delonas Inc. in Boston.*

Statistical Software. We Invented It.

Now, We Revolutionize It.



By integrating the full power and functionality of MS Windows, BMDP New System for Windows Version 1.0 makes data exploration easy. In a typical analysis, you simply enter your data into the data editor, or import it from a database or spreadsheet. Then with a few clicks of a mouse button, you can quickly run a statistical routine and easily generate plots.

MICROSOFT® WINDOWS™ COMPATIBLE

The original developers of statistical software now introduce the first true object-oriented, statistical analysis system running under MS Windows: ***BMDP New System for Windows Version 1.0.***

BMDP New System for Windows is a completely new statistical analysis system designed and built for the MS Windows operating environment.

What makes BMDP New System revolutionary is its true, object-oriented design — the spreadsheet-like data editor, statistical objects, and plots are all dynamically linked. You can select a point within a plot with a mouse click. The corresponding case is then highlighted in the datasheet and any existing statistical calculation is instantly updated. *With dynamic linkage, exploring data is easier than ever!*

In addition, BMDP New System's object-oriented design completely eliminates command language. Easy-to-use, mouse-based Windows operations and features now replace the complex command code programming used in conventional statistical software. *Point-and-click* procedures allow you to graphically set cutpoints when categorizing variables or to store grouping information from a histogram. *Drag-and-drop* operations enable you to easily move variables in and out of a regression model. By setting the preferences for any statistical object, you can limit the analysis to your specified statistical results and tests. With the clipboard tool or dynamic data exchange (DDE) and object linking and embedding (OLE), you can transport results to other Windows-compatible programs.

BMDP

Version 1.0

New System™

for Windows

With unique features like a frequency table editor, a missing data matrix, a chart toolbox, and a subsampling facility, BMDP New System is the easiest way yet to produce numerical results and statistical plots. Each statistical object performs an in-depth analysis with all the statistical tests and diagnostics you may need. And online context-sensitive help, complete with a library of statistical usage and definitions, is available to aid you throughout your analysis. BMDP New System is a flexible data exploration tool that is accessible to all levels of users: powerful enough for the expert, yet easy enough for novices and students to master.

Let BMDP, the company that first developed statistical software, help open the Windows of statistical computing possibilities for you. For a free brochure or more information, **call us at 1-800-238-BMDP.**

BMDP Statistical Software, Inc. • 1440 Sepulveda Blvd., Suite 316 • Los Angeles, CA 90025 • (310) 479-7799 • FAX: (310) 312-0161

BMDP New System for Windows is a registered trademark of BMDP Statistical Software, Inc. Microsoft Windows is a registered trademark of Microsoft Corporation.

Circle 15 on reader service card

Stop Bugs in Their Tracks

The sneakiest macro errors are those that don't tell you there's a problem. Instead you get unwanted results. A superfluous {End}{Down} instruction might send the cell pointer hurtling to the bottom of the worksheet instead of to the bottom of a data range. 1-2-3 doesn't complain—your data just appears in the wrong place. Many macro errors *do* generate error messages. A valuable tool for trapping such errors is the {ONERROR} command. It lets you anticipate errors and write code to resolve them.

{ONERROR} Syntax

{ONERROR *branch_location,[message_location]*} transfers control to *branch_location* if certain kinds of errors occur. *Branch_location* can be the address or name of a range, or a formula that returns an address or a name. It contains the instructions to which 1-2-3 branches when an error occurs.

If you include the *message_location* argument, 1-2-3 stores the error message in that location. *Message_location* can be the address or name of a range, or a formula that returns an address or a name. {ONERROR} can trap any error that causes 1-2-3 to return to Ready mode, such as an invalid cell or range address. It cannot trap syntax errors.

An {ONERROR} command must appear before the instruction that may cause the error. Each {ONERROR} command remains in effect until either an error occurs, 1-2-3 reaches another {ONERROR}, or the macro ends.

Also, since {ONERROR} passes control to another location, you must either complete the macro at that location or loop back to the original location with the {BRANCH} command.

Double the Trouble

The \A macro in the figure uses the File•Combine command to combine data from a range and file you specify into a range named Here. It also moves the range named Here one column to the right so you can combine more data.

To set up this example, you'll need two worksheets. To create the first file, begin in a blank worksheet, position the cell pointer in cell A1, and select */Data•Fill*. Specify range A1..C5 and press **<Enter>** three times to accept the default start, step, and stop values. Assign the name **test1** to range A1..A5 and the name **test2** to range C1..C5. Save the file with the name **data**.

To create the macro, begin in a new worksheet and enter the labels in the figure. Set the width of column B to 20. Select */Range•Name•Label•Right*, specify range A1..A22, and press **<Enter>**.

How the Macro Works

The macro displays a custom menu that asks if you want to combine data or quit. If you select Combine, the macro branches to the routine that begins in cell B7. This routine moves the cell pointer to the range named Here and executes the File•Combine command, which prompts you to specify the name of the range you want to combine and the name of the file that contains it. The macro moves Here one column to the right by deleting it and re-creating it, then passes control back to the \A macro so you can combine another file.

The first {ONERROR} tests whether the file contains a range named Here. If it doesn't, the macro branches to No_here. This routine creates the Here range at the current cell, then passes control back to the Combine routine.

The second {ONERROR} tests whether the range and file names you specified exist. If they don't, the macro passes control to the Checkname routine. This routine causes 1-2-3 to beep, pause, and display the message 'Please respecify range name and file name'. Then it passes control back to the Combine macro and prompts you to enter the correct names.

To test the macro, place the pointer in cell A5 and press **<Alt>-A** (press **<Ctrl>-A** in 1-2-3/W). Select *Combine*. Enter **test1** in response to the range name prompt, and **data** in response to the file name prompt. The macro combines the data from range A1..A5.

Select *Combine* again, but this time enter **test** and **data** in response to the prompts. Since there is no Test range, the {ONERROR} command in cell B9 passes control to Checkname, which prompts you to respecify the names.

```
     A          B                  C      D
1    \a         {MENUBRANCH choices}
2
3    choices    Combine            Quit
4               Combine Another?   Quit?
5               {BRANCH combine}   {QUIT}
6
7    combine    {ONERROR no_here}
8               {GOTO}here~
9               {ONERROR checkname}
10              /FCCN{?}~{?}~
11              /RNDhere~{RIGHT}
12              /RNChere~~
13              {BRANCH \a}
14
15   no_here    /RNChere~~
16              {BRANCH combine}
17
18   checkname  {BEEP}{INDICATE message}
19              {WAIT @NOW+@TIME(0,0,2)}{INDICATE}
20              {BRANCH combine}
21
22   message    Please respecify
```

By Joseph Levine

Joseph Levine is a principal technical writer/editor at Lotus Development Corporation in Cambridge, Massachusetts.

Models on Disk includes the models contained in this article. See page L16 for details. This material is also available on PC World Online on America Online and CompuServe.

LOTUS 1-2-3 RELEASE FOR WINDOWS 4

THE BEAT GOES ON!

The beat goes on for the world's most popular spreadsheet. Lotus® 1-2-3® Release 4 for Windows sets a new standard in usability, performance and power. **Purchase either the full product or the upgrade of Lotus 1-2-3 R4 for Windows before September 30, 1993, and you are eligible to receive Lotus Ami Pro™ 3.01 for the competitive upgrade price of $105, or Lotus Freelance Graphics™ 2.01 for the competitive upgrade price of $114!** No prior ownership of any graphics or word processing package necessary.

THE BEAT GOES ON FOR GREAT SOFTWARE SPECTRUM PRICES, TOO.

LOTUS 1-2-3 R4 FOR WINDOWS	SPECTRUM PRICE
Standard version	$329
Upgrade from previous versions*	$99
Competitive upgrade**	$104

For over a decade, Software Spectrum has provided superior customer service and value to companies just like yours. We offer the convenience of toll-free telephone shopping. Friendly, knowledgeable salespeople who know more than just prices. Reliable technical support. Plus, same-day shipping of orders received before 4:00 p.m. (Central). Don't wait. Call Software Spectrum today!

SOFTWARE SPECTRUM **1.800.824.3323**

201152 7AM TO 7PM (CENTRAL)

*From all previous versions of Lotus 1-2-3 for DOS or Windows. **From most qualifying competitive spreadsheets. Customer must surrender title page or system disk at time of purchase. Call for details. Prices subject to change. Other restrictions may apply. All brand and product names are trademarks or registered trademarks of their respective companies. ©1993 Software Spectrum.

Circle 40 on reader service card

Create Your Own "Add-Ins"

Have you ever wished you could automate the 1-2-3 tasks you need to perform most? The good news is that within certain limits, you can use macros to create programs that extend 1-2-3's functionality, much as add-ins do.

Macros can't add new functions, so if you want to create a true add-in like Wysiwyg, @Base, or Sideways, you need to know how to program in assembler (release 2.*x*) or C (release 3.*x* and 1-2-3 for Windows) and use one of Lotus's add-in development products.

But you *can* create macros that combine existing 1-2-3 functions in useful ways, then turn them into pseudo add-ins by making all the functions accessible to all worksheets. To demonstrate the concept of pseudo add-ins, we'll create a program called Macro Helper.

Macro Helper does just one trick: It helps you assign names to cells within another macro. If you type a name that is already assigned, the macro will alert you and allow you to type another name.

Our simple version of the Macro Helper program will be called release 1. If you want to, you can "upgrade" it to Macro Helper release 2 by adding some routines of your own later.

The next step is to store the macro (and any others you care to add) in memory. If you have 1-2-3 releases 2.2 through 2.4, use the Macro Library Manager add-in to put a library of macros in memory, where they can be accessed by any worksheet.

If you use other versions of 1-2-3, you can store your macros in a worksheet that you keep open, but you'll need to modify them so that they always work with the current worksheet.

Creating Macro Helper Release 1

Clear any open worksheets from memory, then save an empty worksheet with the name **MHELPER**. Set the width of column A to 13, and enter the labels shown in the figure. Then assign the labels in column A as range names for the adjacent cells in column B. If you're using 1-2-3/W release 1.1 with SmartPak, or release 4.0, replace the command in cell B5 with **{BLANK mhelp_retry}{WGETLABEL "OK = use anyway, Cancel = quit",mhelp_retry,,"Name exists–try another"}**. Insert a new row between rows 5 and 6, and enter the command **{IF @CELL("type", mhelp_retry)="b"}{QUIT}** in the now-empty cell B6.

Be sure to save your work. Now let's test the macro by using it to set up a dummy macro in the same worksheet.

Macro Helper's \N macro helps you name macro components. Place the cell pointer one cell to the left of the first component you want to name, and invoke the macro by pressing **<Alt>-N** (**<Ctrl>-N** in 1-2-3/W and release 4.0). Then, all you do is type the name you want to assign to the cell to the right. You don't have to worry about a label prefix when creating a backslash-letter combination; you don't have to issue commands to assign the range name; and you don't have to use the <Shift> or <Caps Lock> key if you follow our convention of using lowercase letters for macro labels. (If you use uppercase labels, change @LOWER in cell B3 to @UPPER.) Let's assume you want to create a macro named \X. Move the cell pointer to cell M1, invoke the \N macro, and enter **\x** at the Name prompt. This simple action enters the label '\x in cell M1 and assigns the name \X to cell N1.

Enter some labels in range N1..N9. Let's assume that you want to use cell N5 as a point to branch to. Move the pointer to cell M5, invoke the \N macro, and enter **routine**. Then move the pointer to cell M7, invoke the \N macro again, and, at the prompt, enter **routine** again. The macro alerts you that you've already used this name. If you press <Enter> (or in release 2.*x*, 3.*x*, or 1-2-3/W without SmartPak, <Esc>), 1-2-3 will reassign the name Routine to cell N7. Instead, enter **routine2**.

Before we continue, it's important to consider that no matter what version of 1-2-3 you're using, the \N macro will stop working if you assign the name \N to a cell in the current worksheet.

When you invoke a macro, 1-2-3 looks for that range name in the current worksheet, then in other open files (macro library files in release 2.*x*, other worksheet files in release 3.*x*, 1-2-3/W 1.*x*, and release 4.0) in the order in which they've been opened. For example, the \N macro contains a {GETLABEL} command that uses the range name Mhelp_retry as an argument and a {BRANCH} command that uses the range name Mhelp_loop1 as an argu-

```
    A          B
1   \n         {GETLABEL "Name: ",@CELLPOINTER("address")}
2   mhelp_loop1 {IF @CELLPOINTER("contents")=""}{DEL}{QUIT}
3              {LET @CELLPOINTER("address"),@LOWER(@CELLPOINTER("contents"))}
4              {IF @ISERR(@@(@CELLPOINTER("contents")))}/RNLR~{QUIT}
5              {GETLABEL "Name exists. Enter another name (Enter or Esc = use anyway): ",mhelp_retry}
6              {IF mhelp_retry=""}/RNLR~{QUIT}
7              {LET @CELLPOINTER("address"),mhelp_retry}
8              {BRANCH mhelp_loop1}
9
10  mhelp_retry
```

THIS MACRO DOES ONE TRICK: It helps you assign names to cells within another macro.

ment. When you assign a range name to a cell in the current worksheet, you disable a macro that has the same name in a macro library or another sheet. Keep this in mind and avoid using duplicate names in the worksheets you develop.

Now let's see how to get the macro file to emulate an add-in—to act like it's part of 1-2-3 and not part of the current worksheet. If you're using release 2.2, 2.3, or 2.4, read the next section. Otherwise, skip to "Creating the 'Add-In' for Other Releases."

Creating the "Add-In" for Release 2.x

The Macro Library Manager add-in lets you move macros into an area of memory that is not affected when you close or retrieve worksheets. It comes with 1-2-3 releases 2.2, 2.3, and 2.4.

Select */Add-In•Attach* and choose *MACROMGR.ADN* from the list of add-ins. Select a number from the menu to assign the Macro Library Manager to an unused function key (select 7 if it's available), and select *Quit*.

Now press **<Alt>** plus the function key you assigned to the Macro Library Manager and select *Save*. At the prompt, enter **MHELPER**. Specify range A1..B10, then select *No* at the Use Password prompt. This erases the macro from your worksheet but copies it into memory and to a macro library file (MHELPER.MLB). You can now invoke the \N macro from any worksheet whenever you want to assign range names within a macro.

To use Macro Helper in future sessions, start 1-2-3 and attach the Macro Library Manager add-in as described earlier. Invoke this add-in by pressing **<Alt>** and the appropriate function key. Select *Load*, specify *MHELPER.MLB*, and select *Quit*.

If you want to add new routines to Macro Helper, remove the current worksheet from memory, invoke the Macro Library Manager, select *Edit*, select *MHELPER.MLB*, and press **<Enter>** twice to copy the library to the current location. Add new routines in the rows below the \N macro. Test them in the current worksheet.

Then invoke the Macro Library Manager, select *Save*, specify *MHELPER*, select *Yes* to confirm that you want to resave the library, specify the range that includes the \N macro and the new routines you've created, and select *No* at the Use Password prompt.

Creating the "Add-In" for Other Releases

Release 3.*x* and the Windows versions of 1-2-3 don't include the Macro Library Manager, but they let you keep a macro worksheet in memory. However, you'll have to modify the macro slightly so it will work properly when another worksheet is current.

Here's why: As discussed previously, when you invoke a macro, these releases of 1-2-3 look for the macro first in the current worksheet, then in other worksheets in the order in which they were

Down Load.

Dow Jones Spreadsheet Link™ 2.0 takes the load off your shoulders.

Spreadsheet Link 2.0 *automatically* collects information from 10 Dow Jones News/Retrieval® databases and loads it into your spreadsheet program. No other communications software can enter this **accurate, timely financial data** *directly* to your Lotus® 1-2-3®, Quattro® Pro, or Microsoft® Excel formats.

Save time and money in one fell swoop with the software that connects you to the premier financial and business information source: Dow Jones News/Retrieval.

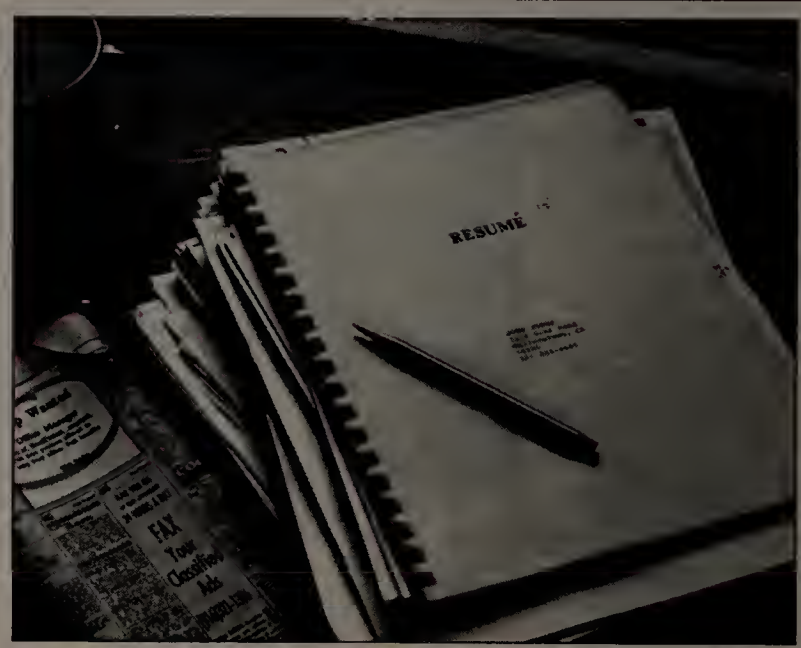
For detailed information including our low price, call **609-520-4642, Ext. 519 or 609-520-4641, Ext. 519.** For literature or a demo disk call 800-522-3567, Ext. 519.

Call today and get the complete lowdown on Spreadsheet Link 2.0!

DowJones® Software

Another product from Dow Jones Information Services. The lifeblood of business.®

© 1992 Dow Jones & Company, Inc. All Rights Reserved



Which One Really Knows Lotus® 1-2-3®?

The Judd Test® for Lotus 1-2-3 can tell you. It presents tasks on screen with Lotus actually running. The person taking the test can use any Lotus function, including help, to do the tasks. The test then scores for both accuracy and efficiency.

Tests are also available for Wordperfect® 5.1, DOS, Microsoft Word® 5.0, and Paradox®. **The Judd Tests** are ideal for employment screening, training, and development.

Call 1-800-634-0424 for more information.

THE PSYCHOLOGICAL CORPORATION®
Harcourt Brace & Company
SAN ANTONIO
555 Academic Court, San Antonio, Texas 78204-2498

Circle 119 on reader service card

opened. When a macro executes an instruction that updates a named cell, however, 1-2-3 assumes that the named cell is in the current worksheet, not in the worksheet that contains the macro. If 1-2-3 doesn't find the named cell, the macro ends with an error message.

To remedy this, you can do one of two things. You can either insert a question mark in double angle brackets («?») to tell 1-2-3 to look for the range name in all open files, or you can preface the range name with the complete path and name of the worksheet in which the cell is located surrounded by double angle brackets.

Create macros that combine existing 1-2-3 functions in useful ways, then make them accessible to all worksheets.

If two or more cells have the same range name, a macro instruction that refers to that name preceded by the term «?» triggers an error message. Using the path and file name is more reliable because it directs data to a specific cell in a specific file, but typing in all those paths and file names can get tedious. The «?» term is usually safe if your macro refers to cells whose names aren't likely to be found elsewhere, like the range names Mhelp_retry and Mhelp_loop1 in the \N macro. To modify the \N macro, add the characters «?» before the *mhelp_retry* argument in cells B5, B6, and B7. Once you've made all these changes, save the worksheet, test it as you did earlier, and then save it once again.

Now open a new file: Select */File•New•Before* in 1-2-3 release 3.*x* (*File•New* in 1-2-3/W or release 4.0). Select */File•Save* in 1-2-3 release 3.*x* (*File•Save As* in 1-2-3/W or release 4.0), and enter a new file name. Now try creating a macro in that new file, using the \N routine to assign names.

One caveat: When you're finished with a file, don't get rid of it with the Worksheet•Erase command; that command removes all files, including Macro Helper, from memory. Instead, in release 3.*x* select */Worksheet•Delete•File* and select the name of the current file (in 1-2-3/W or release 4.0, select *File•Close*). To use Macro Helper in future sessions, simply load the MHELPER worksheet file into memory along with other files. In release 3.*x* you can either retrieve MHELPER first by selecting */File•Retrieve,* or open it after retrieving another file by selecting */File•Open•After* or */File•Open•Before.* If you're working in 1-2-3/W release 1.*x* or release 4.0, just select *File•Open.*

To add new routines to Macro Helper, make the MHELPER worksheet current and add the routines below the \N macro. Then resave the worksheet. In release 3.*x* select */File•Save.* If this command displays the message '[SAVE ALL FILES]', press **<Esc>** once to display the name of the MHELPER file, then press **<Enter>** and select *Replace.* In 1-2-3/W and release 4.0, select *File•Save* to save the current worksheet.

Grow Your Own

Even if you don't need a macro-writing aid, there are other kinds of pseudo add-ins you can create using the concepts illustrated here. For example, you can create a pseudo add-in that assigns commonly used formats or styles, sets up tables, or assists in setting up complex formulas.

If you perform a few 1-2-3 operations dozens of times a day, save yourself some time by creating pseudo add-ins.

By Richard Cranford

Models on Disk includes the models, macros, or formulas contained in this article. See page L16 for details. This material is also available on PC World Online on America Online and CompuServe.

Learn from the best!

Lotus Authorized Training Companies lead the way!

Your time is valuable. You want to learn to use Lotus software the right way. Now discover the features and benefits you've been missing. Find out why only a select few can call themselves: Lotus Authorized Training Companies. Call one near you today!

CALIFORNIA	
Learnsoft, Inc.	(619) 546-1400
New Horizons CLC	(714) 556-1220
The Dublin Group, Inc.	(800) 464-TDGI
Computer Insights	(510) 527-8565
COLORADO	
Productivity Point	(303) 756-5756
CONNECTICUT	
CPCE, Inc.	(203) 925-0400
DISTRICT OF COLUMBIA	
ATA, Inc.	(202) 293-0909
Future Enterprises, Inc.	(202) 662-7610
FLORIDA	
Advanced Comp. Training	(904) 281-9880
PLM TRAINING SOLUTIONS	(904) 733-4412
GEORGIA	
Productivity Point	(404) 816-5833
MASSACHUSETTS	
Ziff Technologies	(617) 890-0009
PPI/Computer Tutor Corp.	(617) 964-5858
MARYLAND	
ExecuTrain of Baltimore	(410) 602-0200
OFFICEPRO, INC.	(301) 468-3312
MICHIGAN	
ExecuTrain of Detroit	(313) 352-9210
Englehart Training Ctrs.	(616) 285-6898
MINNESOTA	
ExecuTrain	(612) 921-8844
MISSOURI	
CompuTrain/Kansas City	(913) 677-9933
NEBRASKA	
ExecuTrain of Omaha	(402) 397-7772
NEW JERSEY	
Ziff Technologies	(609) 799-1588
Transnet Corporation	(908) 253-0500
ExecuTrain	(201) 593-4444
NEW MEXICO	
ExecuTrain of New Mexico	(505) 889-0737
NEW YORK	
CPCE, Inc.	(212) 840-2470
ExecuTrain of Western NY	(716) 852-6716
Ziff Technologies	(212) 248-5330
Tiger Info. Systems	(212) 425-2222
Sage Colleges / ICET	(518) 445-1707
OREGON	
Kinetic Comp. Solutions	(503) 520-0555
PENNSYLVANIA	
Ziff Technologies	(215) 656-7900
Ziff Technologies	(412) 355-0499
VIRGINIA	
ATA, Inc.	(703) 281-7200
WISCONSIN	
ExecuTrain	(414) 792-1880
CANADA	
Ivy Computer Training CTR	(416) 222-1555
MEXICO	
New Horizons CLC	011-525-531-3827

Lotus Authorized Training Company

Can't find an ATC near you? Call Lotus at (617) 693-1454.

Paid for and organized by Co-op Advertising (818) 360-2400.

Suppress Zeros, Extract From a Multisheet File

Constant Suppression of Zeros

Q I use the Worksheet•Global•Zero command to suppress the display of zeros in my worksheets. Why do I have to reissue this command each time I retrieve a worksheet that was saved with zeros suppressed?

John J. Maley, Jr.,
Bordentown, New Jersey

A You must be using 1-2-3 release 2.*x*. When you issue the Worksheet•Global•Zero command, you can specify whether 1-2-3 displays a zero, nothing, or a label in cells that contain a zero or a formula that returns zero. Release 2.*x* does not save this setting with the worksheet, so you must reissue the command each time you retrieve the file. In 1-2-3 release 3.*x*, 1-2-3 for Windows release 1.*x*, and 1-2-3 release 4.0 for Windows, zeros remain suppressed when you open a worksheet.

If you're using release 2.*x*, you can create an autoexecuting macro that will suppress the display of zeros.

Enter the following macro in a blank area of your worksheet:

	A	B
1	\0	/WGZY

Enter an apostrophe before both labels. Place the cell pointer in cell A1, select */Range•Name•Labels•Right*, and press **<Enter>** to assign the label in cell A1 as a range name for the adjacent cell in column B.

If you want 1-2-3 to run this macro each time you open the worksheet, you must first set the default Autoexec setting to Yes: Select */Worksheet•Global•Default•Autoexec•Yes•Update•Quit*. Use the File•Save command to save the file. Now, each time you retrieve the file, the macro will suppress the display of zeros.

Combining Wysiwyg Formatting

Q I'm trying to consolidate a series of worksheets into a master file, but I'm having problems transferring the Wysiwyg formatting. The File•Combine command transfers the data just fine, but it doesn't copy the formatting. I've tried using the Special•Import command; it works the first time, but when I use it to import the formatting from a second worksheet, it wipes out the previous formatting. How do you transfer Wysiwyg styles and formatting between worksheets?

Reuben Starr, Sandy, Utah

A Copying formats between worksheets is easy in 1-2-3 release 4.0 for Windows because both data and formatting are saved in the WK4 worksheet file. But it's a little more complicated in DOS releases and in 1-2-3/W release 1.*x* because the formatting information is stored in a separate file. (A release 2.*x* format file has the same name as the worksheet file but has an FMT extension. Format files in release 3.*x* and in 1-2-3/W release 1.*x* have FM3 extensions.)

In the DOS releases of 1-2-3, you can import Wysiwyg formatting from a source file to a target file by using the Special•Import command. However, even though you can specify a different location for the imported data, formats and graphics appear in the same location in the target file that they occupy in the source file.

For example, suppose you want to combine the first two worksheets below into a third master worksheet. You want the data from the first file to appear in the same location in the target file that it occupies in the source file, but you want to put the data from the second worksheet in a different location, underneath the first set of data.

To import the formatting from the Boston worksheet, you would select :Special•Import•All and enter the name of the file containing the formatting. 1-2-3 imports the formatting from the

PRODUCT SALES - By City
Boston

	Jan	Feb	Mar	Total
Bicycles	1000	1100	1200	3300
Mopeds	600	650	700	1950
Skateboards	400	450	500	1350
Total	2000	2200	2400	6600

PRODUCT SALES - By City
San Francisco

	Jan	Feb	Mar	Total
Bicycles	1750	2000	2500	6250
Mopeds	400	275	152	827
Skateboards	1000	950	700	2650
Total	3150	3225	3352	9727

PRODUCT SALES - By City
Boston

	Jan	Feb	Mar	Total
Bicycles	1000	1100	1200	3300
Mopeds	600	650	700	1950
Skateboard	400	450	500	1350
Total	2000	2200	2400	6600

San Francisco

	Jan	Feb	Mar	Total
Bicycles	1750	2000	2500	6250
Mopeds	400	275	152	827
Skateboards	1000	950	700	2650
Total	3150	3225	3352	9727

first worksheet without a hitch. But when you import the formatting from the second file, the formatting information is imported into range A1..E8, overwriting the formatting imported from the first file, as in the last worksheet on the previous page.

There are two solutions to this problem. You could postpone major formatting until you've finished combining the data. Or you could store your formatting information in a named style and apply that style whenever you need it. You can create up to eight named styles in each worksheet.

To create a style, choose *:Named-Style•Define•1:Normal*, indicate the cell that contains the text attributes you want to store, enter a style name, and enter a descriptive name. Then, to assign that style to a range of cells, choose *:Named-Style*, select the style name from the menu, and indicate the range of cells to format.

If you're using 1-2-3/W release 1.1 or release 4.0, you can use the Windows Clipboard to copy data and cell formatting between files without any problems. To try it, use the *File•Open* command to open both worksheet files, then select *Window•Tile* to display the worksheets side by side. Next, highlight the range you want to copy in the source worksheet, and select *Edit•Copy*. Switch to the target worksheet, position the cell pointer, and select *Edit•Paste*. 1-2-3 pastes the data and cell formatting into the worksheet.

The Edit•Paste Special command in release 4.0 lets you specify the type of information to paste into a cell. If you select Edit•Paste Special•Cell contents only, 1-2-3 pastes only the data from the selected range. If you select Edit•Paste Special•Styles only, 1-2-3 pastes only the style attributes. If you select Edit•Paste•All, 1-2-3 pastes the cell contents and the style attributes.

GOOD IDEAS

Find Missing Loan Data

1-2-3 release 4.0 for Windows includes a number of new financial @functions (@FVAL, @NPER, @PVAL, and @PAYMT) that allow you to use optional arguments in order to find the future value, present value, term, and payment for an annuity due.

The advantage of using the functions described here is that their optional arguments can be used to compensate for missing data.

Warning: You must use 0 for one of the required arguments when you use the future value or the present value as an optional argument.

To try the new @functions, create a worksheet by selecting *File•New*. In the descriptions below, optional arguments appear within square brackets. The optional *type* argument represents the type of annuity you're calculating: ordinary (0)—the default setting—or annuity due (1).

❶ @FVAL(*payments,interest,term,[type],[present_value]*) finds the future value of an investment, given the payment amount, interest rate, and term of the investment.

If you don't know what your payment will be, for example, you can replace the required *payments* argument with 0 and enter a value for the optional *present_value* argument. The formula @FVAL(0,0.07,7,0,32000) finds the future value on an investment of $32,000 paying 7 percent interest over seven years: $51,385.01.

❷ @NPER(*payments,interest,future_value,[type],[present_value]*), like @TERM, finds the number of payment periods needed to reach a future value.

But @TERM can't tell you how long it would take $32,000 invested at 7 percent to be worth $51,385. You can use the new @NPER function with a *payments* argument of 0 to find out: The formula @NPER(0,0.07,51385,0,32000) returns a term of seven years.

❸ @PVAL(*payments,interest,term,[type],[future_value]*) finds the present value of an investment. If you want to know the present value of a future value of $51,385 when you don't know what the payments will be, replace the *payments* argument with 0: The formula @PVAL(0,0.07,7,0,51385) returns $32,000.

❹ @PAYMT(*principal,interest,term,[type],[future_value]*) finds the payment on a loan. If your goal is to have $51,385 in seven years, how much should you invest each year at the rate of 7 percent to achieve your goal? To find the answer, replace the *principal* argument with 0: @PAYMT(0,0.07,7,0,51385) returns $5937.70.

Andrea Powers, Associate Editor

Extracting From Multiple Sheets

Q I'm trying to extract data from one sheet in a multisheet file to one sheet in another multisheet file. Can I do this in 1-2-3?

Stan Strait, Ponca City, Oklahoma

A Yes, you can use 1-2-3's File•Combine command. This command lets you incorporate the contents of a worksheet or range that's on disk into the current worksheet.

When you select File•Combine, 1-2-3 presents three options: Copy, Add, and Subtract. The Copy command copies the specified data from the source worksheet on disk to the current worksheet.

The Add command copies only the numeric data from the source worksheet and adds that to numbers or blank cells in the current worksheet.

The Subtract command subtracts the numeric data in the source worksheet from numbers or blank cells in the current worksheet.

To combine the contents of a specific range, you must first move the cell pointer in the target file to the cell where you want the data to appear. If necessary, use the <Ctrl>-<Page Up> and <Ctrl>-<Page Down> keys to move to the appropriate sheet.

If you're using 1-2-3 release 3.*x*, select */File•Combine•Copy•Named/Specified-Range* and then indicate the address or name of the range that you want to combine and the name of the file that contains that range. 1-2-3 inserts the data at the current cell location.

If you're using 1-2-3 for Windows

GOOD IDEAS

Data Summary With Data Table

I use the Data Table command in a unique way to obtain a monthly summary of the data that I enter daily. To follow along, enter the data shown in range A1..B8 of the following figure. Use

	A	B	C
1	Date	Units sold	
2	05-Oct-92	125	
3	19-Oct-92	345	
4	02-Nov-92	200	
5	16-Nov-92	150	
6	30-Nov-92	75	
7	14-Dec-92	130	
8	28-Dec-92	50	

the @DATE function to enter the dates in column A.

For example, in cell A2, enter the formula **@DATE(92,10,5)**. Assign the Date 1 format to range A2..A8, and set the width of column A to 10.

Copy cell A1 to cell D1, and enter the following formula in cell D2 (in some releases of 1-2-3, the formula initially returns 'ERR'):

@MONTH(A2)=@MONTH(D3)

To create the data table, enter the following formulas:

CELL	FORMULA
A13	@DATE(92,10,1)
A14	@DATE(92,11,1)
A15	@DATE(92,12,1)
B12	@DSUM(A1..B8,1,D1..D2)

Assign the Date 3 format to range A13..A15, and assign the Hidden format to cell B12. Copy cell B1 to cell B11. Select */Data•Table•1*, and specify range A12..B15 as the table range and cell D3 as the input cell. In 1-2-3 for Windows release 1.*x*, select *Data•What-if Table•1-Way* (in 1-2-3 release 4.0 for Windows, select *Range•Analyze•What-if Table*), and specify range A12..B15 as the table range and cell D3 as the input cell. Select *OK*. The results appear in the figure below.

Linda Bolle, Cambridge, Massachusetts

	A	B	C
11		Units sold	
12			
13	Oct-92	470	
14	Nov-92	425	
15	Dec-92	180	

release 1.*x*, select *File•Combine From*, select *Copy* from the Action box, select *Range* from the Source box, and specify the range and file name.

If you're using 1-2-3 release 4.0 for Windows, select *File•Open*, specify the file name, and click *Combine*. In the resulting dialog box, select *Range*, indicate the range, select *Replace Values*, and click *OK*.

Use File • Xtract when you need to split a large worksheet into smaller, more manageable files.

To combine the contents of an entire multisheet file that's on disk with the current worksheet, you must make sure the target file has enough sheets to hold the incoming data. For example, if the source file contains six sheets, the target file must contain at least six sheets. If necessary, use the Worksheet•Insert•Sheet command (in release 4.0, Edit•Insert•Sheet) to insert additional sheets. Go to the first sheet in the current file, and place the cell pointer where you want the data to be combined. To combine the files, follow the appropriate directions given previously but select *Entire-file*.

The cell formats of the incoming data overwrite those in the current file. However, column widths, range names, and other worksheet settings in the current file remain unchanged.

The File•Xtract command works in the opposite direction: It extracts a range of data from the current worksheet and saves it to a worksheet file on disk. This command also saves all the settings of the extracted data. File•Xtract is useful when you need to split a large worksheet into smaller, more manageable files. However, you can't use File•Xtract to extract data to individual sheets in a multisheet file.

File•Xtract gives you two menu options: Formulas and Values. The Formulas command extracts all data, settings, and formulas. The Values command extracts all data and settings but converts all formulas to values.

If you're working in 1-2-3 release 2.*x* or 3.*x*, select */File•Xtract•Formulas*, enter a file name for the extracted data, and specify the range you want to extract. If you enter a file name that already exists, select *Replace* to overwrite the existing file; select *Backup* to rename the file on disk with the BAK extension, and save the extracted range with the existing file name; or select *Cancel* to return to Ready mode.

In 1-2-3/W release 1.*x*, preselect the range you want to extract, select *File•Extract To*, type a file name, choose *Formulas*, and click *OK*. In release 4.0, preselect the range you want to extract, select *File•Save As*, enter a file name in the Save As text box, click the Selected Range Only check box, click *OK*, select *Formulas and Values* from the resulting dialog box, and click *OK*.

Do you have a question about Lotus products or a favorite technique for using them? Think you've found a bug in a recent release of a Lotus product? Send your letters, including your address and daytime telephone number, to Q&A/Good Ideas, PC World Lotus Edition, *77 Franklin St. #300, Boston, MA 02110. We pay $60 for each letter we publish. Sorry, we cannot acknowledge unpublished materials.*

This material was prepared by the PC World Lotus Edition *editors, with the help of the Lotus Development Corporation customer support staff.*

Models on Disk includes the models, macros, or formulas contained in this article. See page L16 for details. This material is also available on PC World Online on America Online and CompuServe.

Full-Text Searching in Notes 3.0

Finding a string of text in Notes 2.1 is easy, but if you're searching a large database, it can be excruciatingly slow. You have to select the group of documents you want to search, choose Find from the Options menu, type the word you want to find, then leave for lunch.

The new Full Text Search feature of Notes 3.0 makes text searching a little easier and a whole lot faster. The key to this speed is a database index—a series of files that tracks every occurrence of every word in a database. Once a database has been indexed for full-text search, finding every occurrence of the word *meeting*, for example, in your 10MB mail database won't take more than a few seconds.

Be aware, however, that an index can consume a considerable amount of hard disk space—sometimes as much as half the size of the database file. So think twice before you index every database on your work space. You can always use the plain text search command to search for words in a database that has not been indexed.

Building an Index

To index a Notes database, select the database, then choose *File•Full Text Search•Create Index*. Click *OK* in the Full Text Create Index dialog box to accept the default settings for now. If you're indexing a database that's on your local workstation, click *Yes* to build the index.

If you add to or delete documents from a database frequently, you'll want to update its index regularly. Your systems administrator probably updates the databases on the Notes server daily, but you'll have to update the databases on your local workstation yourself. To update an index, select the database, and choose *File•Full Text Search•Update Index*, and be prepared to wait a few minutes. It takes Notes about 15 seconds to sort through an average full-page document.

Search Bar and Query Builder

There are two ways to search a Notes database that has been indexed for Full Text Search: You can use either the Search Bar or the Query Builder. If you want to find a single word, use the Search Bar. If you want to find a phrase or create a complex query formula, use the Query Builder.

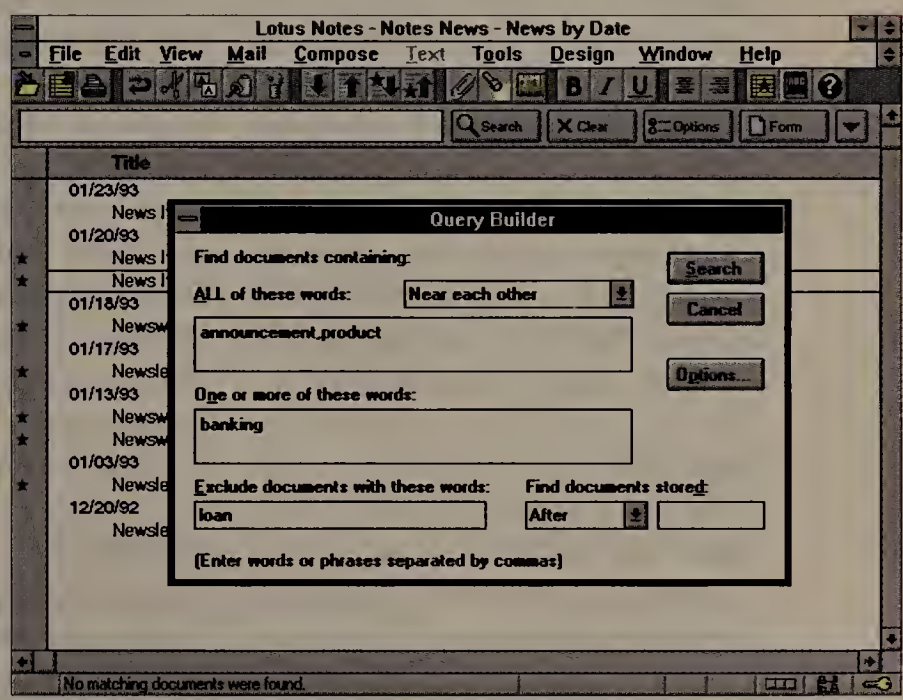
When you open an indexed database, you'll see the Search Bar at the top of the screen, as shown in the figure. (If you don't see it, choose *View•Show Search Bar*.) Choose the view that has the documents you want to search, and type the word you want to find in the query text box that appears in the far left corner of the Search Bar. Click the *Search* button, and seconds later Notes will display the matching documents in the current view.

Now suppose you need to search a press release database for the word *announcement* when it's near the word *product*, but only if the document also contains the word *banking*, without simultaneously containing the word *loan*. Your best bet is to use the Query Builder. Open the database you want to search and choose *Edit•Find* to open the Query Builder dialog box, as shown in the figure. Enter the words you want to find or exclude in the text boxes (separate them by a comma), and select the appropriate criteria from the drop-down boxes to build the query.

Once you've supplied the Query Builder with the appropriate information, just click the *Search* button. Notes translates your responses into a query formula and enters the formula in the query text box in the Search Bar. When Notes has completed the search, it displays the matching documents in the current view.

As you read the matching documents, you'll find that Notes has highlighted with a red box each occurrence of the key word within each document. Press **<Ctrl>-+** (or **<Ctrl>–**) to move to the next (or previous) highlighted word quickly. This is particularly helpful when the word appears sporadically throughout a long document. When you've finished reading the matching documents, click the *Clear* button to clear the search criteria and redisplay all the documents in the current view.

You can also search several databases at once. On the Notes Workspace, hold down the **<Shift>** key while you click the icons for the databases you want to search. After you have selected them all, double-click any one of them while still holding down the **<Shift>** key. Notes displays a special view that includes all the selected databases. When you enter a search string, Notes searches all databases in this view for a match.



NOTES 3.0'S QUERY BUILDER lets you set up powerful text searches on all text in a Notes database or across multiple databases.

By Stephen R. Londergan

Stephen R. Londergan is the education coordinator for Lotus Development Corporation's technical support department.

Break Your 1-2-3 Habits

Improv users who have little or no experience with a traditional electronic spreadsheet often understand intuitively how Improv works and can bang out a worksheet in no time. We experienced 1-2-3 users are the ones who suffer. Because Improv is so different from the spreadsheets we've grown up with, we must "unlearn" the skills and concepts that have become second nature.

If you're one of those frustrated Improv users, we'll help break your dependence on 1-2-3 by pointing out the biggest hurdles along the Improv way.

Your First Time

The worksheet, or model, that appears when you start Improv is the first thing that's different (see **FIGURE 1**). It will probably throw you for a loop, because it looks like you can enter only one cell of data, at the intersection of Items A1 and B1. To create more cells and expand the size of your worksheet, just place the cell pointer on Item A1 or Item B1 and drag the mouse down or to the right. You build an Improv worksheet by beginning in the upper left corner and using these items, which are a column-wise or row-wise association of cells. (The fact that cells are associated is an important concept in Improv.)

Where Am I?

Now that you've created more cells, you'll discover there's no outside reference telling you where the cell pointer is. When you look for a cell reference, you won't find one. Worse, you won't find the familiar control panel.

Like a cell in 1-2-3, an Improv cell takes its name from its column and row position. But unlike in 1-2-3, Improv columns and rows (items) are headed by names you provide rather than by fixed letters and numbers. For example, in **FIGURE 2** the cell at the intersection of the items January and Pens is January:Pens. The status bar at the bottom of the screen shows the cell name. (If you don't see a cell reference, click the directory name or date and time in the status bar until the reference appears; Improv uses the same status bar space to display three types of information.)

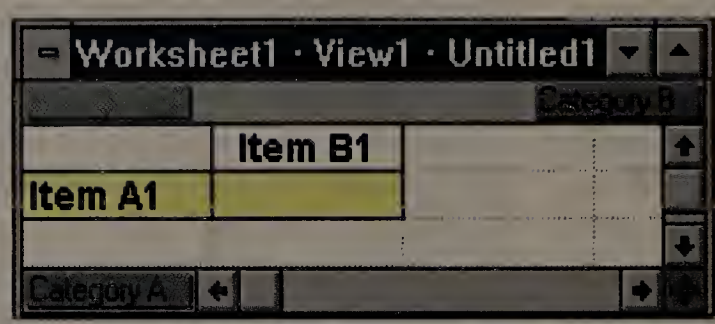


FIGURE 1: IMPROV'S DEFAULT SCREEN has just one cell; expand it out and down to create your model.

In Improv, you use cell names in formulas instead of cell references. You'll find this method invaluable when you distribute a worksheet to others or when you update or reorganize a worksheet, because you'll still be able to understand the logic.

Start With a Plan

To build an Improv model efficiently, you must first identify what information you need and how you need to see it. For example, if you've been tracking sales for your company's product line, you already know you'll need to see sales results by product and by month.

To see data a certain way, you have to establish a category—an association of items—for that view. So put your sales data into two categories. Categories are represented by tiles in the corners of the screen; Figure 2 shows the categories named Product and Month.

You will find that planning a worksheet before you build it can be more important in Improv than in 1-2-3. If you don't take the time to plan your first Improv worksheet, you'll probably spend a lot of time creating and erasing several models before you make a usable one.

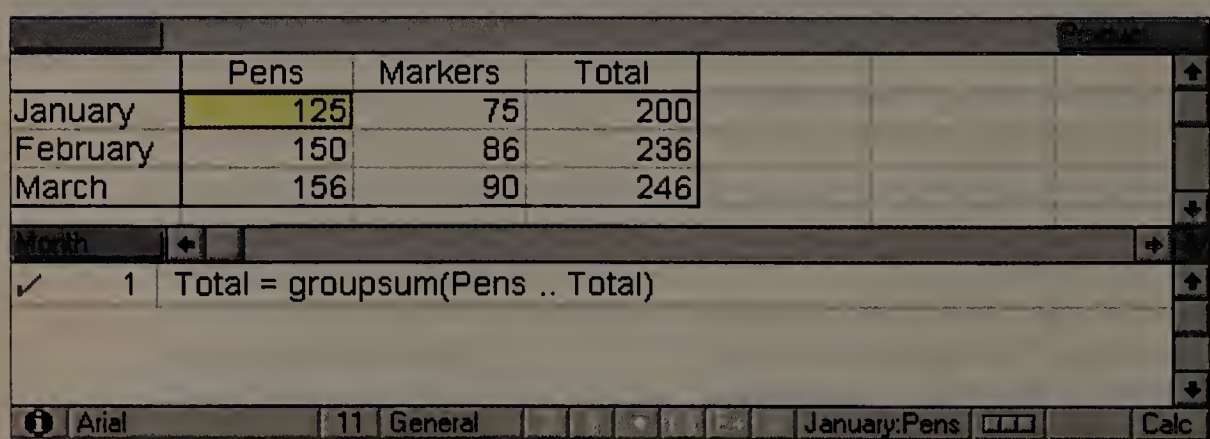
Copy and Move Aren't What They Used to Be

In 1-2-3, you rely pretty heavily on the Copy command when building a worksheet and on the Move command when modifying a worksheet. But when you use these commands, you must take care not to overwrite any existing data. You also have to make sure formulas are pointing to the right cells. In Improv, you expand and rearrange worksheets with just a few mouse clicks.

To copy an item, click on the source item and drag the mouse down or to the right. Improv duplicates the cell formats and formulas but not the contents.

To rearrange a worksheet to your liking, drag the appropriate category tile to the upper left, upper right, or lower left corner of the worksheet frame. **FIGURE 3** shows a rearranged view of the data in Figure 2. This ability to alter the display of a worksheet with a few mouse movements will sell you on Improv.

You'll find the Copy and Paste commands where you expect them, in the Edit menu. But they don't work exactly as you'd expect. The way they work



	Pens	Markers	Total
January	125	75	200
February	150	86	236
March	156	90	246

FIGURE 2: EACH IMPROV CELL'S NAME is based on item names in its column and row. The items here are Pens, Markers, Total, January, February, and March; the highlighted cell is January:Pens.

depends on what you're trying to copy. If you try to copy an item, Improv creates a new item, assigns a default item name to it, and pastes the cell contents and formulas. If you try to copy just a cell, Improv copies the contents, but not the formulas associated with the cell.

In Improv, you'll use Copy and Paste as afterthoughts to correct mistakes in building a worksheet. But you'll find that your dependence on these commands lessens as you become more proficient in building an Improv model.

Change the Way You Build Your Worksheet

Your first encounter with Improv will probably go something like this: You'll create a couple of items, enter data in the first item, and create a formula to total that data. Then you'll enter data in the second item and try to copy the formula from the first to the second. But rather than inserting a new copy of the formula, Improv inserts the result of the formula instead, and you won't have a clue about how to reverse the process.

The solution is easy: Build the formula before you create any more items. Then replicate the entire item by dragging it over or down with the mouse. When you do this, Improv automatically copies the formula to each new item.

Because Improv replicates formulas in this manner, you no longer need to copy formulas down a column or across a row. You simply expand a column or row, and all formulas are instantly replicated.

Deleting Is Different

In Improv, you can delete categories and items as well as clear out the contents of cells. The clear or delete options displayed on the Edit menu depend on what you select.

To delete the contents of a cell, select the cell and choose *Edit•Clear Cell* or press **<Delete>**. Improv presents a dialog box, where you can select *Data only* to delete the data from the cell, *Data & calculated values* to delete the data and any formulas from the cell, or *Styles only* to delete only text attributes and formatting from the cell.

To delete items from your worksheet, select the item or items and choose *Edit•Delete Item* or press **<Delete>**. Improv deletes not only the items but also their associated cells from the worksheet. If you don't like the way you've categorized your items and try to delete the category, Improv will return an error message. Don't junk your worksheet out of frustration. Instead, first delete all but one item in the category, click the category tile, and choose *Edit•Delete Category* or press **<Delete>**. Improv removes the category and its associated item from the worksheet. If you have to delete items to delete a category, however, you probably need to spend more time planning your model.

Taking a Different View

In any release of 1-2-3, you can write formulas that link worksheet files. In Improv, you can create links between worksheets with intersheet formulas, and you can create formula links between models using Windows' Dynamic Data Exchange.

In 1-2-3 release 3.*x*, 1-2-3 for Windows release 1.*x*, and 1-2-3 release 4.0 for Windows, each worksheet file can contain several sheets. In Improv, not only can each worksheet include multiple sheets, but each worksheet can also have multiple views.

The distinction between a view and a worksheet is important. Each Improv view displays the same worksheet data in a different way. When you delete items or change the contents of a cell in one view, the changes are reflected in all other views in the worksheet. In contrast, a worksheet is a separate component in a model and thus operates independently of other worksheets. Unless you've created intersheet formulas, changing the contents of one worksheet has no effect on another. So when you want to change the display of your data, create a view; when you want a different structure or different data within the same model, create a new worksheet.

You no longer need to copy formulas. Simply expand a column or row and all formulas are instantly replicated.

@Functional Differences

In Improv, you don't precede functions with @ to differentiate them from label text. But there are more differences between Improv's and 1-2-3's functions. You usually put 1-2-3 functions like @SUM in each cell in the bottom row of a worksheet to total each column of data. Many Improv functions work the same way as the corresponding 1-2-3 @functions (except that in Improv, you don't enter any formulas in cells, you enter them in the formula pane below the data pane in a worksheet).

In Improv, you should consider creating a separate worksheet for functions that take a multiple-column or multiple-row range as an argument, because a one-time formula won't fit well in a worksheet with a databaselike structure. In the new worksheet, define an item to contain the formula result, and enter the formula in the formula pane. We'll discuss formulas in detail next month.

Keep these differences in mind while you work with Improv, and the steep unlearning curve should soon turn into a gentle slope.

By Catherine Kenny

View by · Month · WRITING

	January	February	March
Pens	125	150	156
Markers	75	86	90
Total	200	236	246

Product

✓ 1 Total = groupsum(Pens .. Total)

FIGURE 3: CREATE A NEW VIEW of your data by dragging tiles. The underlying data remains the same.

Now, with RoundTrip® you can...

Stop Rekeying

your data into 1-2-3 and Excel

Only RoundTrip puts your data in just the right place in the worksheets you already have. And only RoundTrip automatically builds new worksheets for you... complete with formatting and total and subtotal formulas.

RoundTrip reads your reports, sorts, selects and aggregates your data, and delivers complete, ready-to-use worksheets. It finishes jobs that products like Monarch barely start.

RoundTrip reads highly formatted reports from your mainframe, mini or PC software, xBase files, worksheets or ASCII. It turns all your data into useful management information.

RoundTrip costs $495 (Monarch owners can upgrade for only $129) and is unconditionally guaranteed to save you time and completely eliminate errors in your worksheets.

Call now at **(800) 366-3794** or at **(206) 682-3783**. (Systems 3x and AS/400 users please call **(800) 424-6789**).

"RoundTrip is the most versatile tool of its kind... It may well be indispensable."
—PC Magazine, Feb. 1991

Circle Systems, Inc.
1001 Fourth Avenue
Suite 3200
Seattle, WA 98154

READER SERVICE NO. 25

Unlock your Btrieve Data

Live Btrieve Data inside Lotus 1-2-3 !

@Trieve hot-links your Lotus 1-2-3 spreadsheet to data in one, two or a dozen Btrieve files. Just recalc your sheet to read the most current data directly from your Btrieve files. Wilcards, record ranges and filter expressions let you fetch just the data you need. Lotus does the rest. (@Trieve reads and creates Xtrieve data dictionaries to access your Btrieve data.)

@Trieve

1-800-663-8663

SYNEX
Systems Corporation
800 - 1188 West Georgia
Vancouver, B.C. V6E 4A2
1-604-688-8271 EXT 332

READER SERVICE NO. 97

Live General Ledger Data inside Lotus 1-2-3 !

One @ function is all it takes to develop any GL report in minutes. Type this function and F9 will hotlink Lotus to your GL data; summing hundreds of accounts across periods, years, and companies, and return a balance, in under an second!

Learn this one new @function and your GL reporting and consolidation headaches are over forever!

F9 The Financial Reporter works with most popular PC accounting systems. F9 Universal works with data from any accounting system on any platform: micro, mini, or mainframe, and can even work with more than one type of accounting system simultaneously.

F9 The Financial Reporter

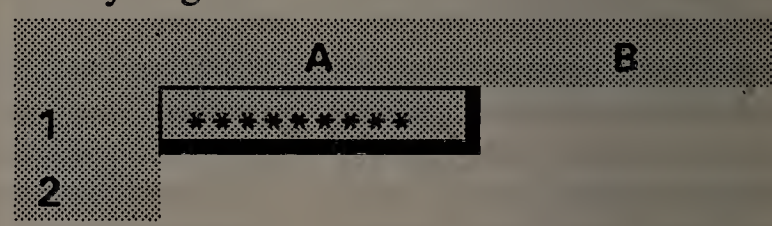
1-800-663-8663

SYNEX
Systems Corporation
800 - 1188 West Georgia
Vancouver, B.C. V6E 4A2

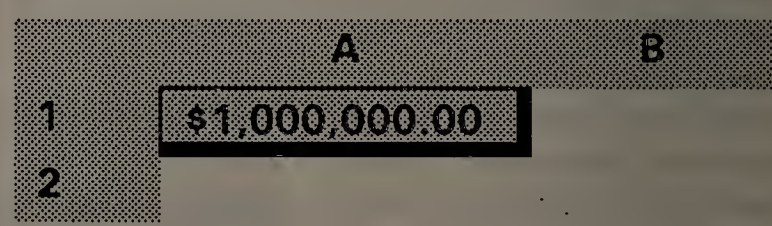
READER SERVICE NO. 80

Automatic Column Width Adjustment for Lotus® 1-2-3® 2.x and 3.x!

Lets you go from asterisks:



To information:



Without touching the keyboard!

Let COLUMN COMMANDER™ adjust your column widths **automatically** for $21.95!

Northfield Software
P.O. Box 0588
Northfield, Ohio 44067
(216) 468-0778

READER SERVICE NO. 96

@nalyst™

Financial @Function Add-Ins for Lotus® 1-2-3®, Symphony®, Microsoft® Excel® & Quattro Pro®

PC MAGAZINE EDITORS' CHOICE
April 16, 1991
Financial @nalyst, Version 1.11

"For those of you who have built huge, overly complex spreadsheets to make up for the limitations found in 1-2-3 financial functions, you'll find *Financial @nalyst* a blessing."

— PC Magazine, April 16, 1991

financial @nalyst — Generalized cash flow analysis. Amortization. Date and business day calculations. MORE!

bond @nalyst — Government, agency, corporate & muni bonds, bills & CDs. Price, yield, duration, etc. MORE!

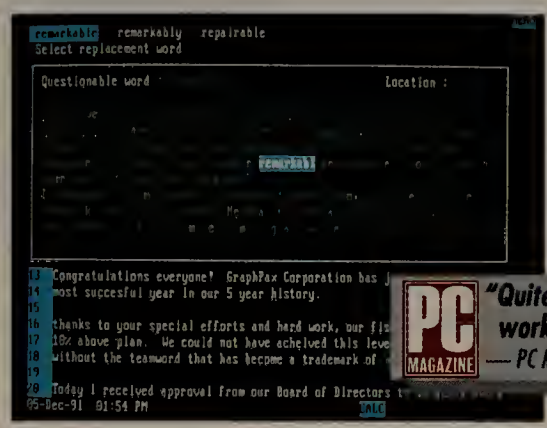
options @nalyst — Black-Scholes & Binomial pricing models with holding cost & dividend adjustments. All "greeks" plus volatility calculations. MORE!

mbs @nalyst — Mortgage-backed securities. Price, yield, duration, factors, implied prepayment. MORE!

Tech Hackers Inc.
50 Broad Street, New York, NY 10004
212-344-9500

READER SERVICE NO. 43

Spellcheck 1-2-3 with Spellin!™



. . . and eliminate embarrassing spelling mistakes.

PC MAGAZINE — *"Quite simply, Spellin! works as advertised."* — PC Magazine, 2/9/93

- 90,000 Word Dictionary
- Personal Dictionary
- Automatic Word Replacement
- Capitalization Fixer
- Repeated Word Fixer

Available now for Lotus® 1-2-3® release 2.x or 3.x! (specify)

30-day moneyback guarantee!

Single User: ~~$125~~ Special $95!
5-User Pack: $350
Please add $5 for shipping/handling.
M/C, Visa, COD, Check, PO.

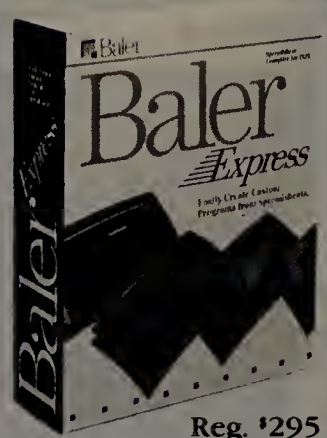
INTEX SOLUTIONS, INC.
35 Highland Circle, Needham, MA 02194
617-449-6222 617-444-2318 (Fax)

READER SERVICE NO. 55

Create Stand-Alone Mini Spreadsheets That Others Can Use

Introducing BALER EXPRESS.
The fastest, easiest way to turn worksheets into tamperproof customized programs that run directly from DOS. No other software is needed to run the application once compiled with Express.

Only Spreadsheet Experience Required.
Great for expense reports, budgets, or complex, macro-driven calculation worksheets that need to be distributed for use by others. Customize and secure these applications with just a few keystrokes. No programming necessary!



Reg. $295
Baler Express Only
LIMITED TIME OFFER $99.99 until 8/31/93
No Risk 60-Day Money Back Guarantee

LOTUS · PC WORLD 1989 PRODUCT OF THE YEAR · PC WEEK 9.8 Rated #1 · PC MAGAZINE EDITORS' CHOICE

TO ORDER CALL
1-800-327-6108

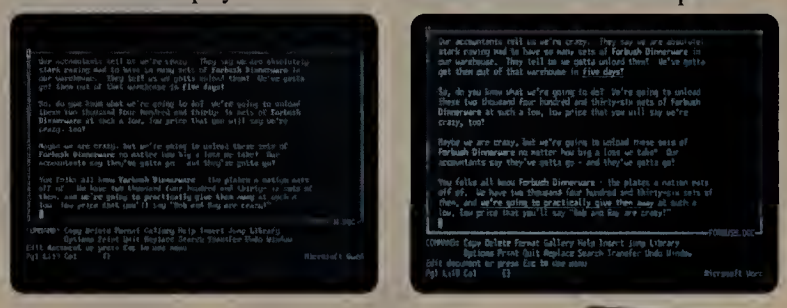
Baler
SPREADSHEET—BASED DEVELOPMENT TOOLS
1400 Hicks Road
Rolling Meadows, IL 60008 USA
708-506-9700 Fax: 708-506-1808

Supports spreadsheet files with .WKS or .WK1 extension from Lotus 1-2-3 Releases 1.0a, 2.x, 3.x; Symphony, Quattro Pro. © 1993 Baler Software Corp. All rights reserved.

READER SERVICE NO. 24

Normal Vision
Here's a typical VGA flat-screen. Note dead space at the top and bottom of the display area.

UltraVision™
Here's the same screen with UltraVision. You get bigger and bolder text with no dead space.



Laptop Screen Test.

UltraVision can give your portable PC a great looking screen. Instantly, on-screen text is much easier to read. You can choose from twenty font styles, adjust grey shades, boost screen writing speed, and see 25, 34, 50 or 60 lines on screen in many applications. Works on laptop and notebook PCs with EGA or VGA flat-screens.

CALL FOR FREE DEMO
1-800-445-3311

personics
234 Ballardvale St.
Wilmington, MA 01887
508-658-0040 FAX 508-988-0105

READER SERVICE NO. 254

TQM

QUALITY TOOLS

for Lotus® 123®

(and compatible spreadsheets)

- **Statistical Charts (4)** (Control, Histogram, Scatter, Pareto)
- **Flowcharts**
- **Cost of Quality Tracking**
- **Team & Project Tracking**
- **Fishbone Diagrams**
- **Problem-Solving Methodology & Reference Guide**

ALL TOOLS CUSTOMIZABLE

One Tool FREE! with purchase

BUDGET-SAVER PRICES:
Each Tool $99 or less!
(discounts on multi-orders)

EZ-STUF™ Development Co.
225 East 66th Street, Suite 2A
New York, NY 10021
(212) 535-2947

Lotus and 123 are reg. trademarks of Lotus Devel. Corp.

READER SERVICE NO. 72

"Solutions, Solutions."

Enhancements for 1-2-3, Symphony, Quattro Pro and Excel Users

Call **617-449-6222** for a **free** copy of our colorful, 32-page spreadsheet enhancements catalog. All solutions from one convenient source!

Examples . . .

- Spelling Checkers
- Forecasting Tools
- Graphics/Presentations
- Accounting Systems
- File/Password Recovery
- @Functions Libraries
- Fonts and Clip Art
- Financial Applications
- Tax Preparation Forms
- Integration/Consolidation
- Bond and Mortgage Analysis
- Spreadsheet Compilers

INTEX SOLUTIONS, INC.
35 Highland Circle, Needham, MA 02194
617-449-6222 **617-444-2318** (Fax)

READER SERVICE NO. 130

Monarch™ Is Your Key To Unlocking Vital Corporate Data

Are you buried in printed reports but what you *really need* is a way to bring report data into your spreadsheet or database? Monarch makes it happen. Monarch reads spooled print files, extracts the data, and lets you see it, sift it, select it, and send it out to popular PC applications. Now every mainframe report used in your organization is a source of vital data, with no rekeying!

CALL FOR FREE DEMO
1-800-445-3311

personics
234 Ballardvale St.
Wilmington, MA 01887
508-658-0040 FAX 508-988-0105

READER SERVICE NO. 185

AutoImport 2.1

Pulls Data from Mainframe Reports into PC Spreadsheets and Databases

Easy to use DOS utility that translates into:

- Lotus 1-2-3
- Symphony
- Excel
- Quattro
- dBase
- Clarion
- Delimited & more

- Selectively imports only needed data from any text file
- Can run automatically from a menu or batch file
- Visual point & pick interface - no programming
- Includes a TSR program to redirect printer output to a file
- Reads and correctly translates % signs, dates, commas, negative indicators, international formatting symbols & more

$189 single user, **$420** 5 user LAN
Call for free demo disk or upgrade information.

404-449-1634 FAX 404-449-0052

SPALDING SOFTWARE, INC.
154 Technology Parkway, Suite 250
Norcross, GA 30092

SPALDING SOFTWARE

READER SERVICE NO. 136

Award-winning **SPSS for Windows**

Real Stats. Real Easy.

Answer your really tough questions

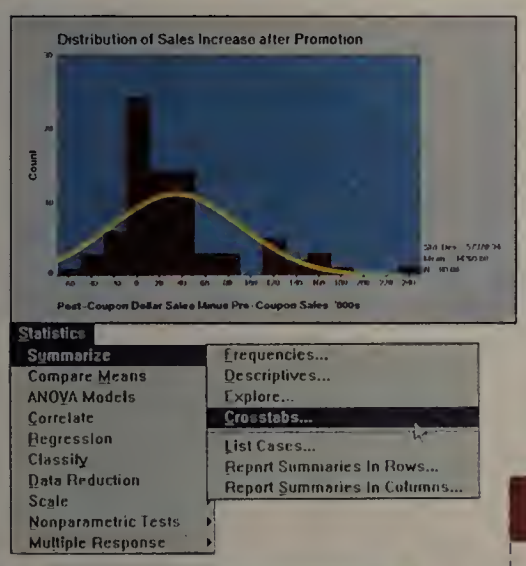
SPSS® for Windows™ set the standard for statistical data analysis software on microcomputers, winning the *PC Magazine* Editors' Choice Award. And now, SPSS 6.0 for Windows gives you more of the analytical tools you need in a program that's even easier to use. You get:

- comprehensive data editing and data management
- increased statistical capabilities
- more high-impact graphics
- flexible reporting features and better connectivity to other applications

All in one affordable, easy-to-use software package.

Automatic Statistical Graphics

"A complete set of graphics and charting capabilities" – Marc Ferranti, PC Week. Create histograms, boxplots, scatterplots, SQC charts and more automatically; there's no relabeling or respecifying.



In-Depth Statistics

"For more statistical analysis tools than you'll get from a spreadsheet such as Excel, without the steep learning curve, SPSS for Windows is a great buy." – Michael Burgard, PC/Computing. Use correlations, crosstabs, regression and more. You won't outgrow this package.

Learn fast, work fast

SPSS 6.0 for Windows is the easy-to-learn, easy-to-use data analysis program that helps you do your analysis quickly and efficiently. Analytical options are clearly displayed in simple, yet complete, menus and dialog boxes. With a program this easy to use, you concentrate on the analysis, not the mechanics.

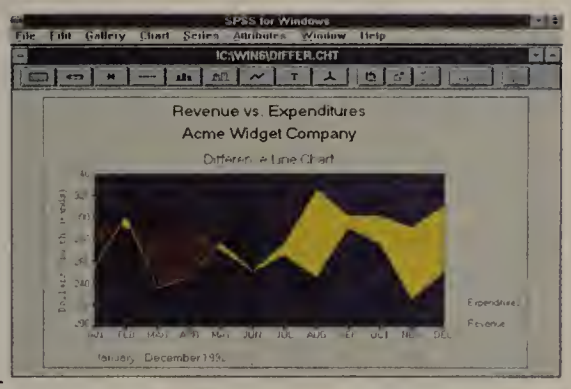
Work your data over

SPSS 6.0 for Windows makes the most of your existing data with the ability to directly read a variety of file formats like Excel™ and dBASE.® And with support for SQL and Microsoft's® new standard, Open Database Connectivity (ODBC), you'll have expanded access to a wide range of databases and applications.

Using the innovative Data Editor, you can enter and label data with exceptional ease – split files; create new variables; take samples; sort and subset data. Preparing data for analysis is fast and simple.

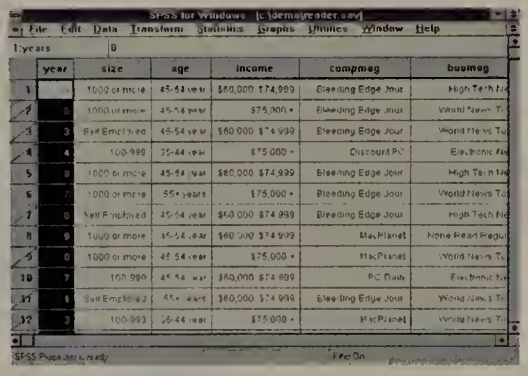
Find the "right" answer

The statistical capabilities of SPSS 6.0 for Windows take you beyond simple sums and percentages. Investigate your data using a complete set of analytical options, including frequencies, crosstabulations, regression and more. See back for details.



See your results clearly and quickly

SPSS 6.0 for Windows produces high-resolution business, statistical and SQC charts complete with labels, automatically. There is a built-in report writer, too, so creating an effective presentation is easier than ever. SPSS 6.0 for Windows will make your statistical data analysis faster and easier, which will save you time and money.



Learn Fast, Work Fast

"Stumbling blocks to statistical analysis are eliminated with SPSS for Windows. You don't have to be a programmer to use it and you don't have to be a statistician to understand it." – Richard O'Reilly, Los Angeles Times. The 100% Windows interface makes doing analysis simple. Hypertext help and an on-line glossary of statistical terms are just a click away.

Call (800) 543-5837
or fax to (800) 841-0064

MICROSOFT® WINDOWS™ COMPATIBLE

BUYERS ASSURANCE SEAL

PC MAGAZINE EDITORS' CHOICE

See back for more information.

Complete Data Management and Editing

"A breakthrough in data capacity and ease of use... impressive." – Alan Fridlund, InfoWorld. Enter data or read it directly from Excel, Lotus, dBASE, SQL databases and more, then edit it and use it many ways – easily.

Call (800) 543-5837 or fax to (800) 841-0064

☐ Rush me Real Stats. Real Easy!

SPSS for Windows $695	Unconditional 60-day money-back guarantee.

Quantity _____
Total _____
Subtotal _____
*Sales Tax _____
Shipping $12.00
TOTAL _____

Media Size ☐ 3.5 inch ☐ 5.25 inch

*Sales tax: add 8.75% in IL, 6.5% in MN, 6% in D.C., 4.5% in VA.

☐ Send me information on these modules:

☐ SPSS Base ☐ SPSS Tables
☐ SPSS Professional Statistics ☐ SPSS Trends
☐ SPSS Advanced Statistics ☐ SPSS LISREL 7
☐ SPSS Categories ☐ MapInfo
☐ SPSS CHAID ☐ QI Analyst

☐ Send me information on SPSS products for:
☐ DOS ☐ Mac ☐ UNIX ☐ _____

Name _____
Title _____
Organization _____
Address _____
City _____ State _____ ZIP _____
Phone Number ( ) _____
FAX Number ( ) _____
Credit Card: ☐ American Express ☐ MasterCard ☐ Discover ☐ Visa
Expiration Date _____
Credit Card Number _____
Signature _____
Purchase Order Number

Mail to: SPSS Inc. 444 N. Michigan Ave. Chicago, IL 60611
Offer expires 12/31/93

A5837A

SPSS
Real Stats. Real Easy.

Reader Service #253

Key Features In SPSS For Windows

Features in red are new to SPSS 6.0 for Windows.

Easy to Learn, Easy to Use

- Easy-to-understand menus and dialog boxes
- Open several windows of different types at once

Create presentation-quality reports

- **Control page layout, use smart title and break wrapping**
- Control summary stats in output
- **Dialog boxes for summaries in columns and other enhancements**

Customize the program

- Determine the amount of virtual memory allocated to SPSS
- Type your own production mode commands
- Make macros for customized tasks
- Refer to on-screen glossary for explanations of statistical terms
- "Undo" an accidental action
- Data and graphics sharing through Dynamic Data Exchange and Object Linking and Embedding
- **Print charts in unattended production mode from command line**
- **Customize your menus to integrate programs in C or FORTRAN and macros from third-party applications with new programming interface tools**

Data Management with Direct Data Editing

- Handle large data sets with an essentially unlimited number of cases and variables
- Sample, sort, rank, count and weight cases
- Add, aggregate, merge, update, split, transpose files
- Increase analytical power through programming functions
- Define multiple missing values
- Perform SQL queries on relational databases via dialog boxes
- Transfer data between SPSS/PC+, SPSS Portable, Excel, Lotus, dBASE, SAS transport, ASCII (tab-delimited), SYLK, Oracle and SQL Server
- **More access to databases and applications with Open Database Connectivity (ODBC)**
- **Reduce amount of SORT workspace needed by up to 87%. The larger the data set, the greater the performance improvements**

Data Editor provides constant data access and editing capabilities

- Enter data directly in an easy-to-use spreadsheet format
- Create, delete, define and edit variable and value labels
- Double-click on a variable to display all its information
- Save all characteristics of a variable definition in a template
- **Current case selections highlighted**

In-Depth Statistical Capabilities in a Logical, Smooth Design

Summarize – descriptive stats, group breakdowns, measures of association

- Frequency counts and tables, descriptive stats, exploratory data analysis, crosstabulations, means for groups, case listings

Compare Means – testing hypotheses about group means

- Independent-, paired-sample t-test
- One-way and simple factorial analysis of variance and covariance

Correlate – measures of association among variables

- Bivariate and partial correlations

Regression – linear regression using weighted or unweighted least squares

- Several methods for variable entry and removal
- Analysis of residuals and influential points

Multiple response – summaries for data in which questions can have more than one answer

- Frequency counts and tables, crosstabulations

Non-parametric tests – analyses which require very limited assumptions about the data

- One-sample tests
- Tests for K-independent and K-related samples

Diagnostic and exploratory statistics – basic analytical graphs

- **Autocorrelation and partial auto correlation function plots, curve fitting, case-plots and more**

Improved data transformations

- **Functions using neighboring observations for smoothing, averaging, and differencing, fast Fourier transformations and its inverse**
- **Interpolate values for missing data**
- **Statistical functions – 58 new fundamental transformations like cumulative distributions, inverse cumulative distributions and random number functions**

Integrated Statistical Graphics with Direct Editing

Select from more than 50 built-in chart types

- Business charts: bar, line, area, pie and many more
- Statistical charts: hi-low, hi-low-close, difference line, range bar, error bar and more
- **SQC charts: Pareto, X-bar, range, sigma and others**
- Produce charts of statistical results automatically or use like a stand-alone graphics package
- **Special handling of missing values in line charts**

Chart Carousel – lets you view and manage charts

- Store multiple charts
- Browse, save and discard charts
- **Print entire chart carousel or selected charts only**

Chart Editor – provides powerful tools for customizing charts

- Edit most any chart element directly
- Select colors, fonts, markers, fill patterns, line styles and more
- Select from over 20 aggregation functions
- Choose any of 10 line-interpolation methods
- Pick from five line-fit options for
- **Independent size and shape control for scatterplot markers**
- **Multiple reference lines in a chart**
- Save selected characteristics of a chart in a template

* This information covers selected features in the SPSS for Windows Base package only. For an in-depth list of features in this and other SPSS for Windows modules, contact your account representative at (800) 543-5837.

Reader Service #253

SPSS

Real Stats. Real Easy.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 73917 CHICAGO, IL

POSTAGE WILL BE PAID BY ADDRESSEE

SPSS, INC.
Attn: Peggy Kirkeng
Marketing Department
444 N. Michigan Ave.
Chicago, IL 60611-9686

Flowcharting

Easier and Faster than *ever* before!

HavenTree has cranked up the power on **EasyFlow** with a release that lets you **create your own shapes**, offers a host of **new text handling features**, exports charts in a wider variety of graphics formats **than any other flowcharting program** and **supports more printers and plotters** than any other DOS-based competitor. We've even given our already highly **intelligent line router** an IQ boost. These **new and improved** features, combined with those listed below, make EasyFlow the **World's #1 flowcharter.**

- *Create new shapes or modify existing ones.*
- *Automatic off-page connectors and adjacent-page mapping help make complex charts easier to read.*
- *Automatic page borders and numbering.*
- *Automatic text formatting.*
- *Context-sensitive help.*
- *Support for LIM expanded memory.*
- *Runs on your network.*
- *Exports charts to ASCII, CGM, DXF, EPS, GEM, PCX, HPGL, SYM, TIFF and WPG file formats.*
- *Charts compatible with EasyFlow Mac version.*
- *Improved color output - HP DeskJet 500C, HP PaintJet, Epson LQ2550.*
- *Tutorial included.*

Introducing EasyFlow 8.0 (for DOS)

EasyFlow is also available for the Mac

See your dealer today or call now:

1-800-267-0668 *ext.47*

(In Canada: 613-544-6035)

HavenTree SOFTWARE

HavenTree Software Limited P.O. Box 470-M Fineview, NY 13640-0470
AD0007-930107

Distributed by Micro Central & Merisel

486 PCs with the Works

With CD ROM drives and software, sound cards, fax-modems, and more, these 21 versatile PCs stand poised to star in your office. Are they ready for center stage?

BY BRYAN HASTINGS AND DAN MILLER

TESTING BY ULRIKE DIEHLMANN AND SUSAN SILVIUS

Ever since the PC made its dazzling debut, it's been expanding its repertoire. It started out as a combination electronic ledger sheet and typewriter, then moved to more demanding parts—fax machine, filing cabinet, interoffice mail service, bulletin board, Rolodex, tape recorder, and occasionally, video arcade game.

Today the PC is poised to take the stage solo, with no need for supporting cast. The time is coming when your desktop system will be the only office machine you'll need; the PC will integrate all its current functionality with the office library, the TV set, the dictating machine, and the telephone to become one integrated office-in-a-box. Think this is a bunch of hype? Consider:

• CD ROM disks—650MB read-only laser disks similar to audio CDs—hold as much data as 450 floppy disks. The days when a company needs banks of file cabinets for reference materials are numbered.

ROBERT CARDIN

SONY
6x
Video 8
Handycam

Exchange Rates
AST

KOSS
KOSS

• Voice-ready fax-modems skirt your company's voice-mail system by turning your PC into a messaging center for voice as well as fax and data. Coming technologies, both hardware and software, will make voice messages as easy to manage as E-mail.

• Sound cards let you add sound to presentations and annotate documents with spoken comments; video capture boards let you add live video as well as sound to documents and presentations. With the larger hard disks and advanced computing power of today's desktop, your PC is fast becoming a potent presentation tool, replacing both the slide projector and the VCR.

Best of all, these attractions are surprisingly inexpensive. CD ROM drives cost as little as $300, and a good sound card and fax-modem can be yours for less than $200 each.

Ready for Prime Time?

Has the office-in-a-box actually arrived? To find out, we asked a cross section of vendors to give us their best "complete" systems costing $4000 or less. Our price point may seem steep, but so were our demands.

We were after 486-based systems decked out with a CD ROM drive, a sound card, and a fax-modem. To go along with the high-powered peripherals, we wanted at least 8MB of RAM, a 200MB hard drive, and a video subsystem capable of displaying 256 colors at 1024 by 768 resolution. We also wanted headphones (or speakers), microphones, and all the necessary software (Windows and DOS plus communications software). Finally, we encouraged each company to add any hardware and software it thought appropriate, within our pricing guidelines, to bring the system as close as possible to the ideal office-replacing desktop.

Despite our stiff requirements, 21 vendors rose to the challenge. As we examined their systems to determine which best fit our definition of the complete PC, we turned up several issues you should take into account when considering one of these powerhouses.

No Ready-to-Run Systems

For one thing, although we had little trouble finding candidates for this review, we had to struggle mightily getting everything to work smoothly. We expected the systems to arrive ready to run, but fewer than half ran trouble-free straight out of the box.

One company sent us a machine with an uninstalled CD ROM drive, several companies omitted the fax-modem, and many neglected to install the fax software, which can be difficult to configure in heavily loaded systems. While these omissions wouldn't be serious in simple configurations, they're real problems when you're trying to cram this many peripherals into an ISA-based system (which almost all our candidates are).

First, each peripheral needs its own interrupt request line (or *IRQ*, the channel it uses to get the CPU's attention). Some peripherals require a specific IRQ, others need more than one, and ISA systems have a limited number of IRQs to pass around. In some cases, you also have to worry about assigning direct memory address (DMA) channels and memory address locations.

Although most of the systems arrived with their peripherals physically installed, we often had to struggle with hardware and software conflicts that knocked one or more of the peripherals out of commission. If our veteran lab technicians had trouble with a system, we shudder to think what might happen to less experienced buyers.

Best Buys

And if that's not problem enough, with the exception of ALR's Evolution IV MPC and NEC's Image 466, none of these boxes came configured with network cards, which are notorious for being incompatible with other peripherals.

For all the above reasons, we pay special attention to customer service in this review. Most companies offer toll-free support, and weekend support is a growing trend, but only four—AST, Compaq, IBM, and Insight—offer 7-day-a-week around-the-clock support. As usual, we called each company anonymously several times to ask some typical customer service questions, scoring responses for quickness and accuracy. We also looked at the details of warranties and on-site service contracts.

Where's the Software?

Another reason the office-in-a-box concept isn't quite ripe: CD ROM–based business programs aren't yet common. Fortunately,

Best Performance

The message is clear: The 66-MHz 486DX2 processor is the key to top performance. All these hot rods were outfitted with at least 128K of secondary cache and made heavy use of their local bus slots. Three machines use a caching disk controller with at least 1MB of cache.

1. **Polywell Poly 486-66VZ** (page 120)
2. **Gateway 4DX2-66V** (page 113)
3. **Axik Ace Cache BusinessPro** (page 107)
4. **ALR Evolution IV MPC 4DX2/66 Model 240** (page 106)
5. **Tri-Star Tri-Win Multimedia System** (page 125)

There's more to the complete-office PC than high performance—service and support are more important than ever in these fully loaded machines. Our five Best Buys scored consistently well in all categories—including price, design, and expandability—offering you solid all-around office achievers.

1. **Polywell Poly 486-66VZ** (page 120)
2. **Axik Ace Cache BusinessPro** (page 107)
3. **Keydata 486-Multimedia WindowStation** (page 114)
4. **AST Advantage Plus 486DX2/66** (page 106)
5. **Micron 466VL Magnum** (page 116)

BEST BUYS: clockwise from lower left, Polywell Poly 486-66VZ, Axik Ace Cache BusinessPro, AST Advantage Plus 486DX2/66, Micron 466VL Magnum, and Keydata 486-Multimedia WindowStation

both PC vendors and business software companies are beginning to embrace CD ROM. As programs grow larger and more complex, floppies become less adequate as a means of distribution, and CD ROMs make more sense. These rigid plastic-encased optical disks are much more durable than floppies and offer an alternative to people who would rather not cope with a dozen or more disks during installation. A number of major programs, including 1-2-3 for Windows and CorelDraw, are already available on CD ROM; Windows NT will be available on CD ROM.

Although we made it clear to the vendors that we wanted business applications on CD ROM, the great majority of the disks we received were games, "edutainment" packs, and encyclopedias. A few systems arrived with CD ROM–based business applications, both specific (MacroMedia's MacroMind Action and Authorware Star multimedia authoring packages) and general (such as Microsoft's Office). Most, however, came with reference works, including Microsoft's Bookshelf and The Software Toolworks's Reference Library, both of which are chock-full of writer's aids such as dictionaries, thesauruses, and indexed collections of quotations, as well as business databases (such as the disk accompanying the Axik PC that lists the addresses and phone numbers of 10 million businesses in the United States and Canada).

In judging these systems for value, we took software bundles into account. We use two methods to determine and report what you will actually pay for each PC. If a computer is sold direct, we simply list its direct price. If it is sold through dealers, we take the average street price based on calls to dealers. We then give each system some credit for its software bundle, based on a percentage of the software's list price.

Only a handful of the PCs exceeded our $4000 limit. AST's amply endowed Advantage Plus takes the biggest bite out of your budget at $4627, while Netis's candidate causes the least damage at $2420. We penalize candidates that exceed our $4000 price point, but we do not necessarily award big points to PCs whose prices fall far below the limit. Our goal was to get as much machine as possible for $4000.

Talk's Not Always Cheap

Get ready for the PC-based voice-mail system—the quintessential office-in-a-PC peripheral that unites your telephone's answering machine, fax machine, and E-mail. The voice-mail system is an integrated communications environment in which each message can be received, retrieved, routed, and stored, all in your PC.

It sounds wonderful, but only five PC vendors—AST, Axik, Compudyne, Eltech, and Polywell—included voice-mail capabilities in their systems. PC-based messaging is still a new, unstandardized technology, and the existing collective of PBX, E-mail, and fax machines already serves many people quite well. PC voice-mail systems also require you to keep your PC on all the time and can cost a lot of hard disk space—up to 250K to record each minute of voice. Using a PC as a voice-mail center should become more practical, however, with the emergence of "green" PCs, which won't cost as much to leave on, as well as larger and less expensive hard drives.

Most of the systems we looked at came with fax-modems that

Best Price

If it was under $3000, it got a Best Price award; it's a sign of the changing times that Compaq picked one up. We emphasized a rich feature set over low cost, but one of these low-cost wonders—Keydata's 486-Multimedia WindowStation—also captured a Best Buy.

1. **Netis N466 VL/MPC** (page 116)
2. **Keydata 486-Multimedia WindowStation** (page 114)
3. **Compaq ProLinea CDS** (page 110)
4. **Eltech Model 4660VB** (page 112)
5. **Blackship BLK 486/50LB** (page 108)

Best Service and Support

The better equipped your PC, the more that can go wrong, so we made service and support a priority when evaluating overall system value. All the vendors that made this list offer on-site service, toll-free tech support, and a 30-day money-back guarantee. Eltech and Polywell tie for fifth place.

1. **ALR Evolution IV MPC 4DX2/66 Model 240** (page 106)
2. **Keydata 486-Multimedia WindowStation** (page 114)
3. **AST Advantage Plus 486DX2/66** (page 106)
4. **Blackship BLK 486/50LB** (page 108)
5. **Eltech Model 4660VB, Polywell Poly 486-66VZ**

went up to 9600 bps for fax and 2400 bps for data, but several vendors included modems that tore up the phone lines with 14,400-bps fax and data. You should have no trouble using data communications programs such as Procomm or Crosstalk with these modems, but fax software can be trickier. While these modems worked fine with their bundled fax software, they may not get along with your favorite fax program at all. The only way you'll know for sure is to call the modem company and ask if its lab has tested its product with your fax program.

Full House

Because these systems already have just about every peripheral you could want, we pay less attention to expandability in this review than we usually do. The real question is, how do vendors cram all these extras into a single box? Some vendors save space by using multifunction cards, such as a multi-I/O adapter (which combines the hard disk, floppy disk, and serial and parallel port controllers on one card) and combination sound card–CD ROM drive controllers.

One expansion feature, however, still deserves your attention: processor upgradability. Even your DX2-66 has an upgrade path these days if it has the 238-pin CPU-upgrade socket. It's unclear right now what chip Intel will eventually provide for that socket: The company initially said it would be a Pentium-based OverDrive for DX2, but heat problems have made that plan uncertain. Current guesses are that it will be some variant of the DX2, a clock-tripled DX3, or a hybrid of Pentium and 486 technology. In any case, you'll be able to put *something* in that socket that will outstrip the DX2-66 in speed. Ideally, this socket should be a zero insertion force (ZIF) socket, which makes removing and installing CPUs as quick and easy as lifting a lever.

In assessing these systems, we also consider a system's overall design and construction. Does the case flex, especially near the system board? Too much warp can crack the delicate traces on the system board, a not-so-uncommon cause of PC failure. What about ventilation? Look for a processor with a heat sink strapped or glued to it, or a ventilation fan on or nearby it, especially if it's a DX2-66. If a system has both, so much the better. Also look for easy access to SIMM and secondary cache RAM sockets.

The Bottom Line

So what else can you ask of your computer if it's going to be your all-in-one business solution? You still need speed. Today's applica-

ALR Evolution IV MPC 4DX2/66 Model 240

VITAL STATISTICS

Direct price: $4027
PROS: Good performer, top-notch service and support
CONS: Pricey, few expansion slots
Contact: Advanced Logic Research, 800/444-4257, 714/581-6770
Reader service no. 612

In terms of performance and features, this ALR offering is truly evolved. The machine comes well stocked with the 486DX2-66 processor, a 256MB hard drive, and 8MB of RAM expandable to 52MB and is amply endowed with 256K of secondary cache.

There's more. The Evolution is one of only two machines in the review with three local bus slots (Tri-Star's offering is the other). Two of these slots support the VESA standard, and the remaining one is ALR's own Cache Local slot. The company populated this slot with an unusual multifunction board that combines a video controller, 256K of secondary cache, and an ethernet controller—the latter touch matched only by NEC in this review. The video controller is especially potent with its Mach32-based video accelerator and 2MB of VRAM, letting you display 65,536 colors, instead of the usual 256, at 1024 by 768 resolution. If that's not enough, you get a speedy 14,400-bps fax-modem and a CD ROM drive that supports the Kodak Photo CD format. ALR bundled five CD ROM disks, including Microsoft's Multimedia Works and Bookshelf.

Despite being dressed to the nines, the Evolution was one of a handful of machines that worked fine right out of the box. In addition to being loaded with hardware, ALR's contender placed fourth in our performance ratings, trailing the leader by only 18 percent. ALR also excelled in service and support. The company did a stellar job on our calls, which, coupled with above-average policies including Saturday hours and a five-year parts, 15-month labor warranty, earned ALR the top spot for service and support.

Despite its very strong showings in performance and in service and support, the Evolution lost its edge in overall design and expansion: only three 16-bit slots, instead of the usual four or five, and no 5¼-inch floppy drive. The Evolution also exceeded our price limit, if only by $27. If performance and service and support are your main concerns, however, this PC deserves serious consideration.

AST Advantage Plus 486DX2/66

VITAL STATISTICS

Street price: $4627
PROS: Excellent service and support, voice mail, tape drive
CONS: Most expensive system in review, not as speedy as other DX2-66s
Contact: AST Research, 800/876-4278, 714/727-4141
Reader service no. 613

This special edition of the AST Advantage Plus is an easy pick as one of our five Best Buys. It packs so many extra features under its mild-mannered exterior, and backs them up with such top-notch service, that this system comes close to our ideal of the complete PC.

tions demand more than ever from your PC, and there's no indication future revisions won't demand more. So as usual, we put these machines through our vigorous workout, consisting of the PC World Test Center's suite of application-based Windows tests and the BAPCo benchmarks, which gauge performance running both Windows and DOS applications.

Despite all that extra hardware, these machines responded like real pros. Since we were looking at a mix of CPUs, we were less concerned with comparing these systems against one another than with the history of test results for their respective CPUs. When we compared them with the other 66s we've tested this year, for example, we found that most of this month's crew were average or better for their processor class; some, including the Gateway and Polywell, were among the fastest we've ever seen.

One minor problem emerged from our testing: The DFI showed anomalous results on the BAPCo SYSmark92 suite. Results on the Harvard Graphics 3.0 section, which includes several print jobs sent to a null printer, are very slow for this PC. Control tests with a real printer installed indicate a still noticeable but less pronounced degradation of performance. When our technicians looked closely, they spotted an AMI November 92 BIOS, which we know can cause the anomaly. DFI is aware of the problem.

We sat down with the test results to pick five of these systems as Best Buys. Taking into account the quality of overall integration, customer service, and design as well as price and speed, Polywell's entry is this review's number one Best Buy. Next in line is Axik's Ace Cache BusinessPro, followed by the entries from Keydata, AST, and Micron.

Whether these machines qualify as offices-in-a-box is a matter of debate. There's no argument, however, that all provide a tremendous amount of computer for the money. Furthermore, there's every indication the desktop computer won't remain content with the lead role in your work place but will eventually play the whole cast of characters. Read on to see which one of these versatile performers could be starring on your desk someday soon.

Bryan Hastings is an associate editor and Dan Miller an assistant editor for PC World. *Research and support by Dawn Furseth, John Goddard, and Anita Hamilton.*

For more information about all products in this article, circle reader service no. 901.

At first glance, the Advantage Plus doesn't appear to be anything special. The minitower is equipped with 8MB of RAM and a 340MB Western Digital hard drive connected to a simple, non-caching IDE controller. Video is handled by a Western Digital Paradise accelerator, which doesn't even support 24-bit color (standard in most systems here). Compared with the other DX2-66s we've tested this year, the AST is only slightly faster (about 8 percent) than the average, turning in its best performance on Windows applications.

Things start to get more interesting when you take a closer look at the system's other peripherals. See that 9600/2400 fax-modem? It comes bundled with a copy of The Complete PC's Complete Communicator for Windows, a software-hardware combo that supports voice mail. The third slot contains a Media Vision Fusion CD 16 sound card connected to a Sony CD ROM drive; since the sound card and CD ROM drive are bundled together by Media Vision, the two components work together seamlessly. Look at the front of the case: The company included a 120MB tape drive, an addition that *none* of the other vendors thought to provide.

AST's smarts don't stop with the PC. The company offers a year of free on-site service and toll-free tech support 24 hours a day, 7 days a week. When we called tech support, the staff answered two of our three questions correctly, but the third answer was off target. The representatives also lost a few points for keeping us on hold once for more than 5 minutes. Media Vision provides a 12-month warranty for the CD ROM drive and sound card, and The Complete PC offers a 7-year warranty for The Complete Communicator fax-modem.

The AST is the most expensive system in this review, exceeding our $4000 limit by more than $600. However, that price buys you a raft of software, including Microsoft Office, WinFax Pro 3.0, and that copy of The Complete Communicator we mentioned earlier, along with a passel of entertainment titles.

If it had been a tad faster and a bit less expensive, the Advantage Plus would have been our number one Best Buy. As is, its integration of voice mail and a tape drive with CD ROM, sound, and fax-modem makes it an excellent choice if you want to fit as much desktop functionality as possible into a single PC.

Axik Ace Cache BusinessPro

VITAL STATISTICS

Direct price: $3998
PROS: 22 percent faster than average 66, voice mail
CONS: More expensive than some
Contact: Axik Computer, 800/234-2945, 408/735-1234
Reader service no. 614

When it comes to breeding the complete PC, some companies aim for purebreds, using nothing but their own fax-modems, their own sound cards, and their own CD ROM drives. Others choose to hybridize, picking from a variety of vendors and then combining components to create a whole machine. Axik has taken the latter course and done such a good job, its Ace Cache BusinessPro earns a Best Buy.

So how mixed are this system's bloodlines? Inside the tower case you'll find a Media Vision Pro AudioSpectrum 16 sound board connected to one of Texel's double-speed DM-3024 CD ROM drives. For communications, Axik uses Macronix's MaxFax 14,400/14,400 external fax-modem *and* Talking Technology's BigMouth voice-mail board (yes, we said *voice mail*). One of the two VESA local bus slots is filled with Diamond's Stealth 24 VLB video card; the other local bus slot is free. The 240MB Quantum

ProDrive LPS hard drive plugs into a Promise DC-99 Super IDE controller with 1MB of disk cache.

The Ace Cache BusinessPro doesn't seem to be suffering from any performance identity problems, however: It's the third-fastest system in the review overall and nearly 25 percent faster than the average DX2-66 we've reviewed thus far this year. It posted some particularly fast times in the BAPCo suite, which gauges performance running both DOS and Windows applications, especially in the database and graphics sections. If its current speed isn't enough for you, the system CPU sits in a 238-pin, ZIF P24T socket, which means you'll be able to upgrade to Intel's OverDrive for DX2 when that chip is finally released.

Axik sells this system for just under our $4000 price limit. However, that price includes a large (if sometimes impractical) collection of software, including Publish It 2.0, Symantec's Q&A 4.0, The Software Toolworks's Reference Library, and a miscellany of CD titles. Axik also supports the system well, with a year of free on-site service and convenient Saturday tech support hours. Our tech questions were answered quickly and in all but one case, correctly.

With the Axik, mixing and matching turns out to be a great way to put a blue ribbon full-featured system together. If you want a speedy PC that can handle almost any office task thrown at it, the Axik Ace Cache is one of the best deals here—which is why we recommend it as a Best Buy.

Blackship BLK 486/50LB

VITAL STATISTICS

Direct price: $2595
PROS: Low price, good service and support
CONS: Slightly underpowered
Contact: Blackship Computer Systems, 800/531-7447, 408/432-7500
Reader service no. 615

The Blackship BLK was one of a number of machines that required some extra rigging to get going. We had to reinstall DOS and Windows several times before the system would complete our tests. Once under full sail this PC showed impressive power, but not enough to move to the front of the pack.

Many of the BLK's features equal or surpass those of the best PCs here. The BLK came equipped with 8MB of RAM expandable to 32MB, 256K of secondary cache upgradable to an impressive 1MB, and two VESA local bus slots. One of these slots is populated with Orchid's Fahrenheit VA/VLB video controller, the other with a multifunction serial/parallel/floppy drive–hard disk adapter. The fax-modem sends and receives faxes at 9600 bps and data at 2400 bps.

The BLK's weakest quarter, however, is its 50-MHz 486DX processor. The most powerful PC processor available only two years ago, the 486DX-50 has since been eclipsed by the DX2-66, the chip of choice for most vendors here. For its price, the BLK is impressive, but it still falls in the lower half of the performance charts.

Blackship's tech support provided fast, knowledgeable answers to our questions. Support policies are strong, if not exceptional. However, while its features and price are very good, this system lags in the crucial area of performance.

While the Blackship's performance might seem to be a major drawback, you might be tempted to go with the low cost and live with it until the 238-pin OverDrive for DX2 chip becomes available, since the BLK comes with a CPU-upgrade socket for it. However, this CPU would add more heat to the inside of the Blackship case, and you would likely have to add extra ventilation since the only fan in the system is buried in the power supply. Our recommendation? Spend the extra money for a more powerful system.

Compaq Deskpro 4/33i

VITAL STATISTICS

Street price: $3653
PROS: Nice CD ROM drive, slim design, 3-year warranty
CONS: Low performance, poor expandability
Contact: Compaq Computer Corp., 800/345-1518, 713/378-8820
Reader service no. 616

No question about it: Compaq's gotten mighty aggressive on pricing. We were pleasantly surprised to receive a fully decked out PC for less than $4000. In fact, Compaq sent us two systems, this Deskpro 4/33i being the better-equipped model.

Compaq still has a way to go, however, to match the price/performance of its hottest competitors. Most striking is this system's 33-MHz 486DX processor, one of the least-powerful CPUs in this review. While the Deskpro came with 8MB of RAM, its 64K of secondary cache is less than most of these machines offer. We weren't surprised at the comparatively low performance figures.

In fact, feature for feature, the 4/33i could look better. While its 240MB drive may be adequate for most users, the capacity is still one of the lowest. And the system doesn't have a 5¼-inch floppy drive. Its CD ROM drive has pretty favorable specs—300K-per-second data transfer and 290 ms access time—but it doesn't come with any CD ROM software.

This is a truly slim desktop—just under 4 inches tall—but you pay a price for compactness. While the integrated video controller eases card congestion a bit, the 4/33i has only four slots—all 16-bit ISA. This PC came in dead last on expandability. At least getting inside the case is simple. The 4/33i is one of the few PCs to come with an easy-open case, and it's easy to lift out the hard drive to access the secondary cache sockets beneath.

Given Compaq's history of strong telephone support, you might expect its service and support to lift the ratings. Indeed, not only is Compaq one of the few vendors to offer around-the-clock tech support, weekends included, its 36-month warranty is matched only by NEC. This time around, however, it puts in an uneven performance on support calls. Taking it all into account, we had to rank

CACHE ROM C&T 286 IPX DRIVERS UMB 386MAX **QUALITAS**® BLUEMAX 486SX BUFFERS MODEMS

When running DOS applications in Windows, is there something you're running out of?

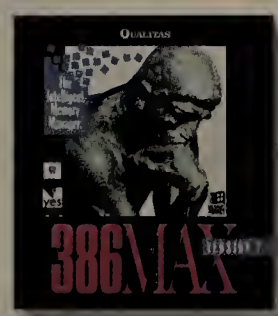
Introducing 386MAX Version 7.

If you use DOS applications under Windows, you know how quickly memory gets used up. Which is why you should explore new 386MAX® Version 7, the most effective memory manager in the universe.

That's because new 386MAX is so well integrated with the workings of DOS, you actually get better, more flexible DOS under Windows than with DOS alone. Including up to 736K of conventional memory in each DOS session thanks to our powerful new Windows features. That's 100K more than you'll get even with the improved memory management built into new DOS 6. Plus, new 386MAX makes it easy to get top performance from each DOS application in Windows by guiding you effortlessly to the optimum configuration for your system.

We even make DOS itself better, especially if you move to new DOS 6. By freeing up extra memory for applications, and for using more of the 200K of the built-in DOS 6 utilities. By giving you more intelligent, more automated memory management features, including new QMT, the easy, reliable way to test the integrity of your memory.

And by providing new MultiConfig Maximize which, unlike DOS 6, ensures fully optimized memory in a number of different boot configurations.



So if you're looking for a memory manager that really shines, there's no need to search the galaxies. Instead, get new 386MAX 7 for any 386, 486 or Pentium™-based PC for just $99.95. Or get BlueMAX™ 7 for genuine IBM brand PCs at just $124.95.

Call toll-free today to order direct, or for our special limited time $29.95* memory manager upgrade offer. 1-800-473-0486.

The Intelligent Memory Manager™

Circle 236 on reader service card

BLUEMAX 386 486SX EGA DRIVERS 486 C&T 286 DOS 5.0 HMA WINDOWS VGA MOUSE DPMI BIOS HIGH DOS TSRs NETWORKS XMS INITIALIZE RAM FAX BOARD

PAGEFRAME CACHE LIM EMS DPMI CD ROMS UMB 386MAX RAM

RAM PAGEFRAME BIOS MEMORY VGA MOUSE TSRs HIGH DOS EGA INITIALIZE DPMI MODEMS 640K FAX BOARD 386SX

XMS HIGH DOS EGA INITIALIZE HMA WINDOWS 640K NETWORKS 386SX PAGE

1993 ANNUAL WINDOWS 100 W MAGAZINE WIN AWARD

yes It runs with NetWare

© *1993 Qualitas.* Qualitas, 7101 Wisconsin Avenue, Suite 1386, Bethesda, MD 20814. *All company and product names are trademarks or registered trademarks of their respective owners.* **System requirements: Any 386, 486, or Pentium micro-processor based PC or PS/2, min. 256KB of extended memory, DOS 3.3 or higher, high density floppy disk or hard disk drive.** **plus $6.95 shipping & handling in continental U.S.*

Compaq a few points below its norm for service and support, although it still received a decent rating. If reliability and brand name matter, then you might consider this system, but we'd recommend the Best Buy AST instead.

Compaq ProLinea CDS

VITAL STATISTICS

Street price: $2681
PROS: Low price, 3-year warranty
CONS: Slower than other systems reviewed
Contact: Compaq Computer Corp., 800/345-1518, 713/378-8820
Reader service no. 617

Perhaps we should be getting used to it, but the idea of putting the words *Compaq* and *low cost* in the same sentence still seems strange. Nevertheless, with a street price of $2681, the ProLinea CDS is one of the most inexpensive systems here, well under our $4000 limit and still loaded with all the extra peripherals we asked for.

The ProLinea's $2681 street price is the third lowest in this review. How does Compaq do it? For one thing, it uses its own components whenever possible. These include the 15-inch 15FS monitor, the CD ROM drive, the 9600/2400 fax-modem, and the 240MB hard drive.

Compaq also saves money by integrating components onto the motherboard: The hard drive is connected to an on-board IDE adapter, and the monitor is connected to an on-board Tseng ET4000/W32 video controller on a proprietary local bus. The only significant third-party component beyond the video controller is the Media Vision Pro AudioSpectrum 16 sound board.

Also, this system's software bundle is less valuable than some other vendors'. Although you do get a copy of Spinnaker's PFS:WindowWorks integrated software, most of the other titles would be more at home in your family room than your office.

The compact case has no externally accessible drive bays free, a cost-cutting move by Compaq that perhaps many users could live with. But the boldest cost-cutting move comes in an area some buyers might regret: performance. In a review crowded with DX2-66s, this system putters along with a 486SX-25 and is easily the slowest system here; the only other machine even close to the bottom rung is the Tangent, which is based on Cyrix's Cx486S-40 processor.

Despite its low price, owners of this machine still get Compaq's exemplary 24-hour toll-free tech support and 3-year warranty. Unfortunately, success may be overtaking even Compaq's vaunted tech support system: Despite its history of consistently stellar customer service, this month our callers waited on hold as long as 17 minutes. Also, Compaq is one of the few companies in this review that doesn't offer a 30-day money-back guarantee.

If an SX-25 is enough for you, and reliability counts, this system is an excellent value from a proven vendor. If you want something a little faster, you'll have to keep looking.

Compudyne 486DX2/66 Mini-Tower

VITAL STATISTICS

Street price: $3999
PROS: TylN 2000 voice-mail/fax-modem, 17-inch monitor
CONS: Average performance
Contact: CompUSA Direct, 800/862-3095, 214/702-0055
Reader service no. 618

When we said we wanted a complete PC, the folks at Compudyne must have rubbed their hands together with glee—they managed to pack an astonishing number of features into this little minitower.

The base system is tricked out with a DX2-66 in a 238-pin CPU-upgrade socket, 8MB of RAM, a 256K secondary cache, Diamond's speedy Viper VLB video card in a local bus slot, and a roomy 420MB Western Digital hard drive. Compudyne met our demands for a sound card and CD ROM drive with a Media Vision Fusion CD 16 bundle. The 17-inch MAG monitor looks great. Compu-

Late List Prices

We were able to compare prices for 19 systems in this review. Prices for only 4 fell more than 10 percent during the 60 days between our two rounds of calls.

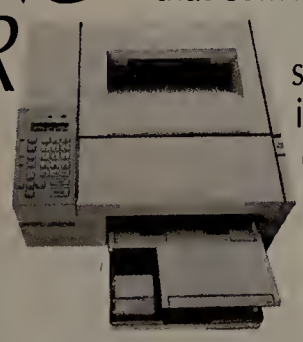
Price Drops Slow Down

	List price as of July 1993	Price drop from May 1993
ALR Evolution IV MPC 4DX2/66 Model 240	$4027	none
AST Advantage Plus 486DX2/66	$4092	$535
Axik Ace Cache BusinessPro	$3998	none
Blackship BLK 486/50LB	$2595	none
Compaq Deskpro 4/33i	[1]	
Compaq ProLinea CDS	[1]	
Compudyne 486DX2/66 Mini-Tower	$3999	none
DFI Model 466 MPC	$3599	$100
Duracom DeskSaver 486/66DX2	$3449	$200
Eltech Model 4660VB	$3299	$150
Gateway 4DX2-66V	$3439	$568
IBM PS/ValuePoint 466DX2/D Model 6384-WS9	$4000	none
Insight 486-33 VL Multimedia Office	$3799	$200
Keydata 486-Multimedia WindowStation	$2795	none
Micron 466VL Magnum	$3644	$355
NEC Image 466	$4475	none
Netis N466 VL/MPC	$2420	none
Polywell Poly 486-66VZ	$3555	$440
Tandy 466 DX2	$3725	$100
Tangent Black Box M440	$2999	$750
Tri-Star Tri-Win Multimedia System	$3795	$200

[1] Compaq does not have list prices.

TO WIN THE PAPER CHASE

STOP CHASING PAPER



Okidata has brought the paper chase to a resounding and refreshing halt with the invention of DOC•IT, the revolutionary, desktop document processor that combines a multitude of talents.

With DOC•IT, Okidata has integrated faxing, printing, copying, scanning, cutting and pasting in one unit with a footprint so compact, it takes up just a corner of your desk. Incorporating graphics capability compatible with Windows™ and most major software, DOC•IT lets you create and communicate finished presentation-quality documents–complete with visuals–without having to get out of your chair.

No more standing in line. Everything sits on the corner of your desk: simple, handy, productive and private; and incredibly easy to use. If DOC•IT looks good to you on paper, come see it in action at your nearby authorized Okidata DOC•IT dealer. Or give us a call at 1-800-OKI-TEAM.EXT 267.

THE SMARTEST CORNER OF YOUR DESK.
DOC•IT™ BY OKIDATA®
a Division of Oki America, Inc

DOC•IT T.M., Okidata Reg. T.M. M.D. OKI Electric Industry Company, Ltd. Windows T.M. Microsoft Corp.
"THE END OF THE PAPER CHASE" Reg. T.M. Micro Dynamics, Ltd., Silver Spring, MD.

Circle 199 on reader service card

dyne seals the deal by throwing in a National Semiconductor TyIN 2000 card, which combines a 9600/2400 fax-modem with voice mail, voice recording (for memos and annotations), and audio playback.

Unfortunately, despite the nifty hardware, this box's performance proved just average for a DX2-66. It does best in the database and graphics sections of the BAPCo suite but fares less well in the Word for Windows and Excel segments of our Windows tests.

The company told us you can buy this system for $3999, a decent price for a machine with a heavy-duty feature set. While Compudyne's support policies (which include a year of free on-site service) are fine, the company lost some points for long hold times and an inaccurate answer to one question. These little service stumbles, combined with the system's unremarkable performance, make it hard to recommend this system over any other.

DFI Model 466 MPC

VITAL STATISTICS

Direct price: $3699
PROS: High-performance CD ROM
CONS: Poor performance (partially due to AMI BIOS problem), lacks 1.44MB floppy drive
Contact: DFI, 916/568-1234
Reader service no. 619

The unpretentious Model 466 MPC looked like a hot contender at first. This PC came well stocked with a 66-MHz DX2 CPU, 8MB of RAM, and an ample 128K secondary cache. DFI was also one of the few companies that, sensibly, eschewed speakers and sent headphones instead, which make more sense for an office environment. All this for an attractive $3699 price tag made us think this humble-looking PC was destined for the Best Buy chart.

But it was not to be. We were put off by the system's surprisingly congested layout—SIMMs squeezed between the last ISA slot and the hard drive, secondary cache hidden under the drive cage, and cables packed tightly together in the center of the machine. We also found it strange that DFI opted to put in the larger 5¼-inch floppy drive but omit the much more popular 3½-inch drive. The only business software included on CD ROM was Microsoft Works.

The Model 466 falls down hardest where it counts the most: performance, and service and support. The Model 466 turned in surprisingly poor Windows and BAPCo numbers, below even the 33-MHz 486DX-based Compaq Deskpro. This poor performance is due at least in part to an incompatibility between the DFI's BIOS and the Harvard Graphics section of the BAPCo test.

The system comes with a year of free on-site service, but DFI offers 9 hours of tech support on weekdays only and no 30-day money-back guarantee. Considering that we had to hold as long as 16 minutes, DFI could use a toll-free tech support line. Once we got through, though, all questions were answered perfectly. In short, DFI's machine checks in at a decent price but with disappointing performance and service and support. If low cost is your main aim, check out Keydata's PC instead.

Duracom DeskSaver 486/66DX2

VITAL STATISTICS

Street price: $3572
PROS: Fast in BAPCo tests, good software bundle
CONS: Iffy central support
Contact: Duracom Computer Systems, 800/551-9000, 214/518-1200
Reader service no. 620

The DeskSaver offers high speed at a decent price but suffers in comparison with the better-equipped machines. At $3572 on the street, the DeskSaver is well below our $4000 ceiling, and it's the seventh-fastest system in the review, 13 percent ahead of the average. The PC scored especially well in the BAPCo tests, and its Windows results were still plenty fast. This DX2-66 system comes with a 256K secondary cache, and a 340MB Western Digital hard drive with 4MB of cache RAM. Five of the six 16-bit slots in the DeskSaver's compact case are occupied by the caching controller, the I/O board, a Zoltrix 14,400/14,400 fax-modem, a Microsoft Windows Sound System sound card, and a Future Domain ISA SCSI card that connects to Toshiba's XM-3401B CD ROM drive. Its software bundle, which includes copies of Microsoft's Bookshelf and the multimedia version of Microsoft Works, is particularly well suited to business buyers.

Duracom pales in comparison with other vendors when it comes to service and support. The company won't guarantee on-site service, though Duracom says 99 percent of its dealers offer it. The company offers telephone tech support, but it hopes buyers will call dealers first. Other vendors also scored extra credit by adding 238-pin CPU-upgrade sockets, tape drives, or voice mail. Consequently, while the DeskSaver meets our requirements for the complete PC, it lacks the extras that might have elevated it above the rest.

Eltech Model 4660VB

VITAL STATISTICS

Direct price: $3449
PROS: Very good service and support, voice mail
CONS: Below-average CD ROM drive
Contact: Eltech Research, 800/358-8330, 510/438-0990
Reader service no. 621

In a letter accompanying the 4660VB, Eltech claimed it wanted to "overwhelm the user with our office-in-a-box." As we pored over the documentation—nearly 20 pounds of it for the system and its peripherals—we knew Eltech meant business.

For one of the lowest prices listed here, you get a power tower stocked with the top-of-the-line DX2-66 CPU, 8MB of RAM, 256K of secondary cache RAM, both types of floppy drives, a 17-inch monitor with a video subsystem that can display 1280 by 1024 resolution, and The Complete PC's Complete Communicator voice-mail system. Although the 4660VB came chock-a-block with features, all components are very accessible. Even its keyboard is better equipped than most, with 129 keys, two sets of 12 function keys, diagonal cursor keys, and a built-in calculator.

Eltech also applied the more-is-better principle to software. The 4660VB offers more CD ROM titles than most vendors in this review: Microsoft Works, Microsoft Bookshelf, and a presentation program and tools from MacroMedia titled MacroMind Action and Authorware Star.

Service and support impressed us, including a money-back guarantee, a tight 2-day turnaround on repairs, and a toll-free tech support line. In addition to offering solid policies, Eltech consistently gave the right responses to our tech calls. However, Eltech is less than generous with its warranty (only one year), on-site service ($69 per year), and support hours (9 hours on weekdays—relatively meager compared with others in this review).

But Eltech's PC did so well in so many other categories, why didn't it earn a Best Buy? Despite its 66-MHz DX2 processor, the Eltech faltered on the lab bench, ending up in the lower half for performance. Its CD ROM also left us flat, with a sluggish 390 ms access time and 171MB-per-second data transfer rate and a small 64K buffer. Still, the Eltech nearly made our hit parade. Even though the 4660VB placed eighth for overall value, it finished very close to our fifth-place Best Buy. If a slight performance lag doesn't concern you, give Eltech's machine a serious look.

Gateway 4DX2-66V

VITAL STATISTICS

Direct price: $4007
PROS: Fastest Windows machine reviewed
CONS: Can't get through to tech support
Contact: Gateway 2000, 800/846-2000
Reader service no. 622

After looking at this system's configuration and test scores, we would have bet a week's salary it would be one of our Best Buys. Good thing we don't make our living at the track. Despite the 4DX2-66V's excellent design and speed, the system's overall value is dramatically reduced because of Gateway's ongoing problems with customer support.

But first the good news. This Gateway is the fastest Windows system we've ever tested. Credit goes to Gateway's impressive base configuration, which includes 16MB of RAM and a 256K secondary cache. The ATI video board sits in one of two VLB slots, and the 340MB hard drive attaches to an integrated VLB IDE connector. As for our extra peripherals, Gateway includes Microsoft's Windows Sound System and its own CD ROM drive and Telepath 14,400/9600 fax-modem. One nice bonus: a 15-inch CrystalScan monitor. Gateway also throws in one of the best software bundles in this review. You get your choice of one of several business packages from Microsoft and Borland; for just $99 more, you can get the CD ROM version of Microsoft Office, which includes Excel, Word, PowerPoint, and Microsoft Mail—a remarkable deal if you want to get an office up and running in one fell swoop. Unlike most of the other vendors here, Gateway doesn't include any CD titles with the CD ROM drive.

But then there's Gateway's support. For the second month in a row, we were unable to get through on Gateway's toll-free number during regular business hours. This complication hurts the company severely. Although the tech support lines are open 18 hours a day during the week as well as on Saturday, and Gateway includes a year of free on-site service, this does little good if you can't reach a support person.

One wag blames Gateway's ongoing service problems on the company's already having hired everybody there is to hire in South Dakota. Whatever the reason, we hope Gateway finds a solution soon so we can go back to admiring its systems for what they are: fast, well configured, and reasonably priced. Until then, the smart money is on other systems.

IBM PS/ValuePoint 466DX2/D Model 6384-WS9

VITAL STATISTICS

Direct price: $4000
PROS: Fast CD ROM drive, solid support policies
CONS: Lackluster performance, few expansion slots
Contact: IBM Direct, 800/ 772-2227, 800/426-2968

IBM? We are as surprised as you to see these three letters in a review that emphasizes the most features and performance for your dollar. Yet it's true. With its new IBM Direct service, Big Blue is out to show the world it's no longer above it all, especially when it comes to price. For $4000, IBM offers a lot of system in a surprisingly clear, friendly design.

This ValuePoint is one of the few entries with an easy-open case—just press a button on the front panel to slide the lid off. It was also nice to find the 66-MHz 486DX2 processor plugged into a 238-pin ZIF socket, allowing for easy upgrading as more powerful processors become available. IBM also provided a VESA local bus slot and a generous 340MB hard drive.

This ValuePoint is small, even for a compact desktop. Despite the small case, IBM included five expansion slots. Several slots are still free, however, since both the hard disk adapter and video controller are integrated on the system board. The video system and monitor support 1280 by 1024 resolution, though you'll likely want to avoid

that resolution on the 14-inch monitor. IBM also bundled a 9600/2400 fax-modem along with Delrina's popular high-end fax program, WinFax Pro 3.0, but it didn't include a data communications program.

Despite all this horsepower, the ValuePoint checked in with middling performance, at least in comparison with this group of speedsters, running about 40 percent slower than the fastest. This PC could have benefitted greatly from secondary cache RAM; even 64K might have made a big difference. In fact, IBM offers this system with 128K of cache for the same $4000 price but failed to include cache in the system it sent us to test.

IBM's service and support policies remain excellent. Though its 1-year warranty is considered the minimum these days, the company throws in free on-site service, a 30-day money-back guarantee, and toll-free support day and night, even on the weekends. (There's no turnaround policy because all repairs are handled on site.) We were slightly less impressed by IBM's handling of our tech support calls. Hold times were acceptable, but two of the reps' three answers were only partially correct.

Even though the ValuePoint's performance and price weren't good enough to make it a Best Buy, IBM has shown that it's come a long way. Keep an eye on future developments from IBM Direct.

Insight 486-33 VL Multimedia Office

VITAL STATISTICS

Direct price: $3999
PROS: Extremely fast for a DX-33, good software bundle, 17-inch monitor
CONS: Slower than most here
Contact: Insight Distribution Network, 800/755-9628, 602/350-1128
Reader service no. 623

Like a high-school quarterback in the Super Bowl, this Insight system may be good at what it does, but it's out of its league here. While most of the systems here use DX2-66s, this one uses a DX-33. To no one's surprise, it's one of the slower machines. However, when you compare it to others of its ilk, it's a screamer: In the BAPCo tests, it's the fastest 33 MHz we've tested lately.

Except for the CPU, everything about this machine is optimized for speed. The system connects the 250MB Western Digital hard drive to a DTK local bus adapter; the 17-inch Philips monitor hooks up to an STB PowerGraph VL-24 video card. To meet our other demands, Insight added a Media Vision Pro AudioSpectrum 16 sound board, a Texel DM-3024 CD ROM drive, and a Boca 9600/2400 fax-modem. A 238-pin ZIF socket will let you upgrade to a more powerful processor.

Insight comes with one of the best software bundles in the review, including Microsoft's Office and Bookshelf, 1-2-3 for Windows, Publish It, and a slew of CD reference works. Unfortunately, Insight still charges top dollar—$3999 direct for a comparatively slow system. Additionally, Insight's customer service could be better. Tech support kept us on hold too long, although once we got through, our questions were answered accurately. The company offers 24-hour tech support but no on-site service or repair turnaround policy. Still there's much to like about this system; with its current configuration, however, it can't keep up with this crowd.

Keydata 486-Multimedia WindowStation

VITAL STATISTICS

Direct price: $2795
PROS: Low price, business software bundle, excellent tech support
CONS: None
Contact: Keydata International, 800/486-4800, 908/755-0350
Reader service no. 624

We talk a lot about speed, but honestly, that's not all we care about. Give us a good price, top-drawer service, and all the right peripherals, and even if performance is just adequate, we can be pleased. In the case of this Keydata system, in fact, we can be so pleased we'll award a Best Buy.

Of course when we say *adequate* performance here, we still mean *screaming*—it's just that the Keydata doesn't scream quite as loudly as some of the others. It didn't make our top five for speed, but it's still plenty fast. It was the sixth-fastest Windows machine in this review, up to 16 percent faster than the average DX2-66 in our Windows suite, and its times in most BAPCo tests were average compared to other DX2-66s.

If its speed is less than top-notch, its price puts the Keydata way ahead of the pack. At $2795 direct, it's less expensive than all but one of the DX2-66s in this review (Netis is the cheapest). That price also gets you an excellent Windows software bundle, which includes copies of Norton Desktop for Windows, Quattro Pro 1.0, and PFS:WindowWorks.

Keydata doesn't skimp on service and support either. Tech support performed flawlessly, fielding our calls quickly and accurately. The toll-free lines are open 11 hours weekdays and Saturdays. The system's 18-month warranty includes a year of free on-site service and a 2-day turnaround guarantee on factory repairs (the CD ROM drive and sound card are covered separately by Aztech, their manufacturer).

As for hardware, Keydata gave us everything we asked for but no more. Along with the usual 8MB of RAM and 256K secondary cache, the system uses a 240MB Maxtor hard drive, which in turn is connected to a VLB IDE adapter (with no disk cache). An STB PowerGraph VL-24 local bus video board connects to a 15-inch CTX monitor. To meet our demands for a "complete" configuration, Keydata installed an Accex 9624 fax-modem and an Aztech multimedia kit, which connects a Sound Galaxy CD ROM drive to a Sound Galaxy NX Pro sound card.

We were looking for complete packages in this review, and Key-

The most complete hand scanning system you can find in a box. Or a store. Or in town. Or in the world for that matter.

Quickly scan text and images into your computer with the OmniScan 256 grayscale scanner. OmniScan produces true 8-bit grayscale at 400 dpi and features advanced illumination technology and solid tracking for the most accurate scanning.

With OmniScan, you can send, receive, OCR, and compress faxes right from your computer using Caere's FaxMaster technology. All you need is a fax modem. OmniScan does the rest.

Scan directly into any application with OmniPage Direct. Direct employs Caere's AnyPage technology to provide the most accurate OCR possible. Font sizes, styles, and formats are no problem for OmniScan Direct's OCR.

Image Assistant GS makes grayscale image editing and enhancement a snap. The "Assist Mode" displays sample image variations right on your computer screen. All you have to do is choose the one that works best for you. And to help you add your own personal touch to images, Image Assistant GS features a complete set of editing tools and features.

Caere's full integration of grayscale scanning, OCR, image editing, and fax capabilities make OmniScan the most complete hand scanning solution found anywhere. Now that you have discovered it, here's how to locate the dealer nearest you: 1-800-535-SCAN.

Featured at these resellers:

MICRO CENTER THE COMPUTER DEPARTMENT STORE® · MicroWAREHOUSE® · COMPUTER CITY SUPERCENTER · EGGHEAD SOFTWARE

caere™

For Your Information.

Caere and OmniScan are registered trademarks of Caere Corporation. The Caere logo, OmniPage Direct, AnyPage, Image Assistant, and FaxMaster are trademarks of Caere Corporation. © 1993. All rights reserved.

Circle 17 on reader service card

data delivered. It didn't just cram a bunch of peripherals into a case; it gave us the hardware we wanted for this particular review and backed it up with all those other things—speed, price, and service—that we *always* want. The end result is an excellent package that easily wins our recommendation as a Best Buy.

Micron 466VL Magnum

VITAL STATISTICS

Direct price: $3999
PROS: Good performance, good service and support
CONS: Sparse software bundle, skimpy hard drive
Contact: Micron Computer, 800/438-3343, 208/465-3434
Reader service no. 625

Micron is proof that there's more in Idaho than potatoes, lumber, and Sun Valley. This Boise-area company sent us a bruiser that, despite driver problems that hobbled performance at first, managed to climb onto our Best Buy charts.

The 466VL scored above average to excellent in all categories, including service and support. We were impressed by the support staff's sharp responsiveness to our tech calls; they were knocked off base only by our toughest question. Also, except for the lack of BBS and fax support, Micron's policies were better than average, with free on-site service, a 30-day money-back guarantee, very tight 2-day turnaround on repairs, toll-free support, and 11-hour support on weekdays and Saturdays.

The 466VL came with everything we've come to expect in a high-performance machine—486DX2-66 CPU, 8MB of RAM, 256K of secondary cache RAM, a pair of VESA local bus slots, and some nice extras such as a 238-pin, ZIF CPU-upgrade socket and an easy-open case. The video system also came loaded for bear. The video controller is Diamond's Viper VLB local bus adapter, which has 2MB of fast video RAM; with the accompanying 15-inch monitor, it's one of the few video systems here to offer 1280 by 1024 noninterlaced video at a reasonable rate (60 Hz). Micron's system also sports a relatively high-performance CD ROM drive—its 280 ms access time, 300K-per-second data transfer rate, and 256K buffer put this drive up there with the best of them. It's also one of the few to have a local bus SCSI adapter. The 466VL's performance checked in at ninth place, less than 30 percent behind the fastest system here.

Drawbacks? Heavy-duty multimedia users will chafe at the comparatively skimpy 213MB hard drive in this compact desktop. We also hoped to get more CD ROM–based software in the bundle. By the time you read this, however, the SoundBlaster Pro sound card/CD ROM bundles will have been replaced by the SoundBlaster Pro Deluxe, which has more CD ROM titles, including Creative Talking Scheduler, a program from Creative Labs that lets your PC remind you verbally of appointments.

Despite these minor complaints, unless a large hard drive is essential, this Best Buy Micron should be on your short list.

NEC Image 466

VITAL STATISTICS

Direct price: $4475
PROS: Fast, great integration, ethernet card
CONS: High price
Contact: NEC Technologies, 800/388-8888, 508/264-8000
Reader service no. 626

This system has *NEC* written all over it—literally. The box we received uses an NEC MultiSpin CD ROM drive and one of NEC's 17-inch 4FG monitors. Everything about this system is part of a seamlessly integrated whole.

Take a look inside the sturdy desktop case. The motherboard has integrated IDE and SCSI connectors to which a 340MB Western Digital hard drive and the CD ROM drive, respectively, connect. The system comes equipped with an ethernet adapter (ALR was the only other company to provide one). Graphics are handled by a Tseng ET4000/W32 controller integrated on NEC's proprietary Image Video local bus. The 486DX2-66 CPU sits in a 238-pin ZIF socket, connected to 16MB RAM and a 256K secondary cache.

Thanks in part to local bus graphics and plentiful memory, the NEC Image is the sixth-fastest system here, due in large part to its blazing scores in our Windows tests; its time on our Excel test is now the fastest we have on record. Its overall performance is 17 percent faster than the average DX2-66 we've tested this year.

Too bad the NEC isn't a little more average when it comes to price. It costs $4475 direct, more than all but the AST. Service and support are good, with a great 3-year warranty and free on-site service. Even with its relatively high price, the NEC Image misses a Best Buy by the narrowest of margins. If you don't mind spending the money, this Image system is an extremely attractive value.

Netis N466 VL/MPC

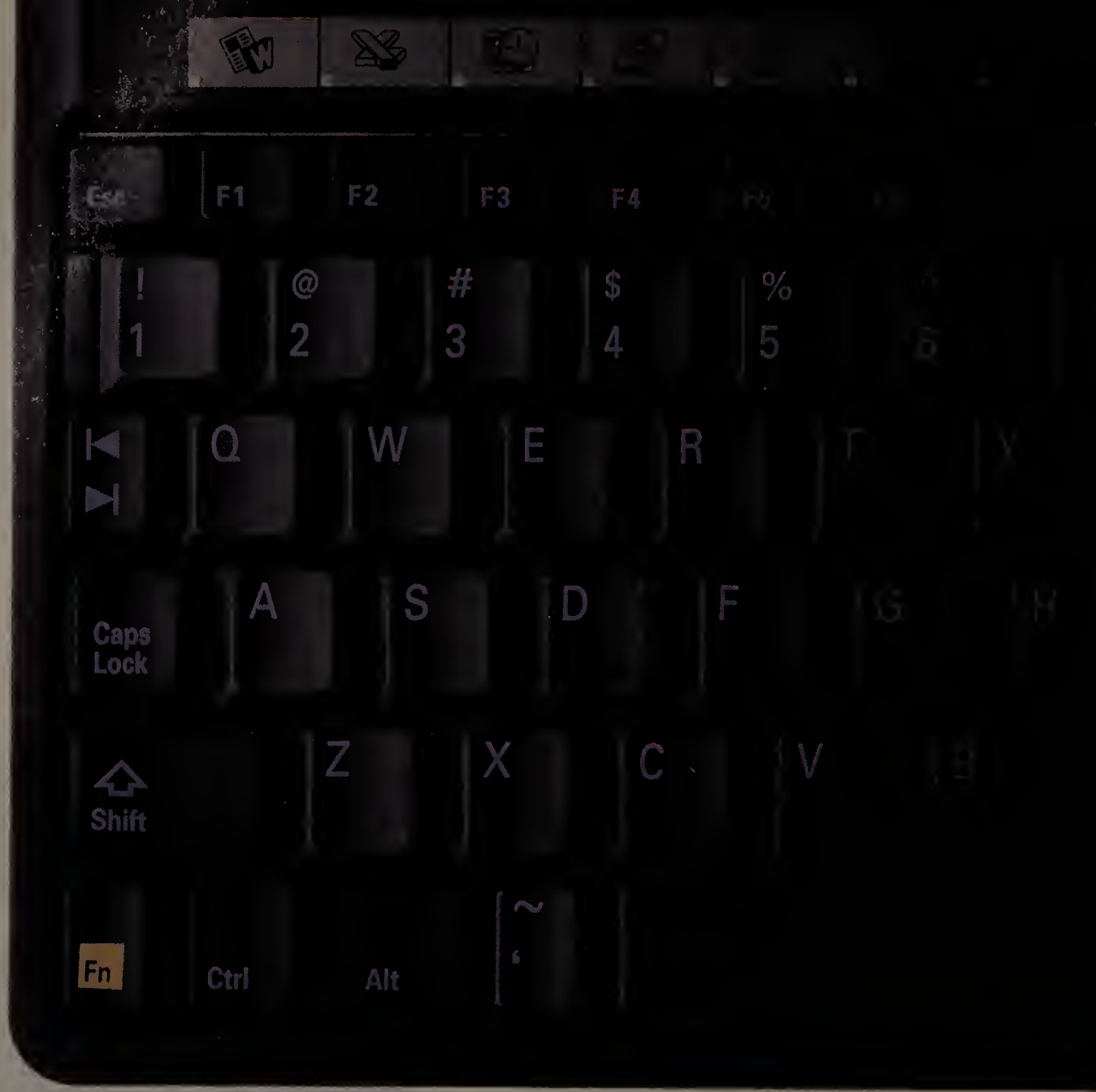
VITAL STATISTICS

Direct price: $2420
PROS: Great price, solid performance and service and support
CONS: Slow CD ROM drive
Contact: Netis Technology, 408/263-0368
Reader service no. 627

You can almost hear Netis declaring, "We will not be undersold!" Its office-in-a-box PC is the lowest-priced system in this review. We weren't as wowed by this compact desktop's features. Netis took the high road with some components, especially silicon: DX2-66 processor, 8MB of RAM, and 128MB of

Hewlett-Packard and Microsoft are changing the way business travelers work.

HEWLETT PACKARD OMNIBOOK 300



Actual size ▶

***Dimensions** (closed): 1.4″ high x 11.1″ wide x 6.4″ deep.*

***Weight:** Less than 3 pounds: flash disk model lighter.*

***Processor:** 386SXLV CPU.*

***Display:** 640- x 480-dot VGA; 9-inch LCD; 16-level gray scale.*

***Available PCMCIA Version 2.0 slots:** Flash disk model: 2 slots. Hard disk model: 1 slot.*

***RAM:** 2 MB expandable to 8 MB with optional, user-installable RAM expansion card.*

***I/O:** 115k-baud serial RS-232, serial infrared and parallel. Optional 2400-baud data; 9600-baud send/receive fax/modem.*

© 1993 Hewlett-Packard Company. *Suggested U.S. list price. Microsoft and MS-DOS are U.S. registered trademarks and Windows is a trademark of Microsoft Corporation. PG12302A

Introducing the HP Omni

It's the best thing going for people who travel on business. Because it's the lightest full-function PC with a full-size keyboard. And it's loaded with all the features busy travelers need to take with them.

At less than 3 pounds, it lets people on the go breeze through airports. Measuring a sleek 1.4″ x 11.1″ x 6.4″, the HP OmniBook 300 won't slow business travelers down. And their fingers can move across those familiar keys just as fast as on their office PC. Because the keys are the same size.

With 9 hours of battery life, travelers can keep on going. That's continuous use of the flash disk model. (Flash disk cards, with no moving parts, greatly increase battery life, as well as reliability.) And the battery pack recharges in less than 1.5 hours. Or drop in four AA batteries. Even the hard disk model lasts 5 hours between charges.

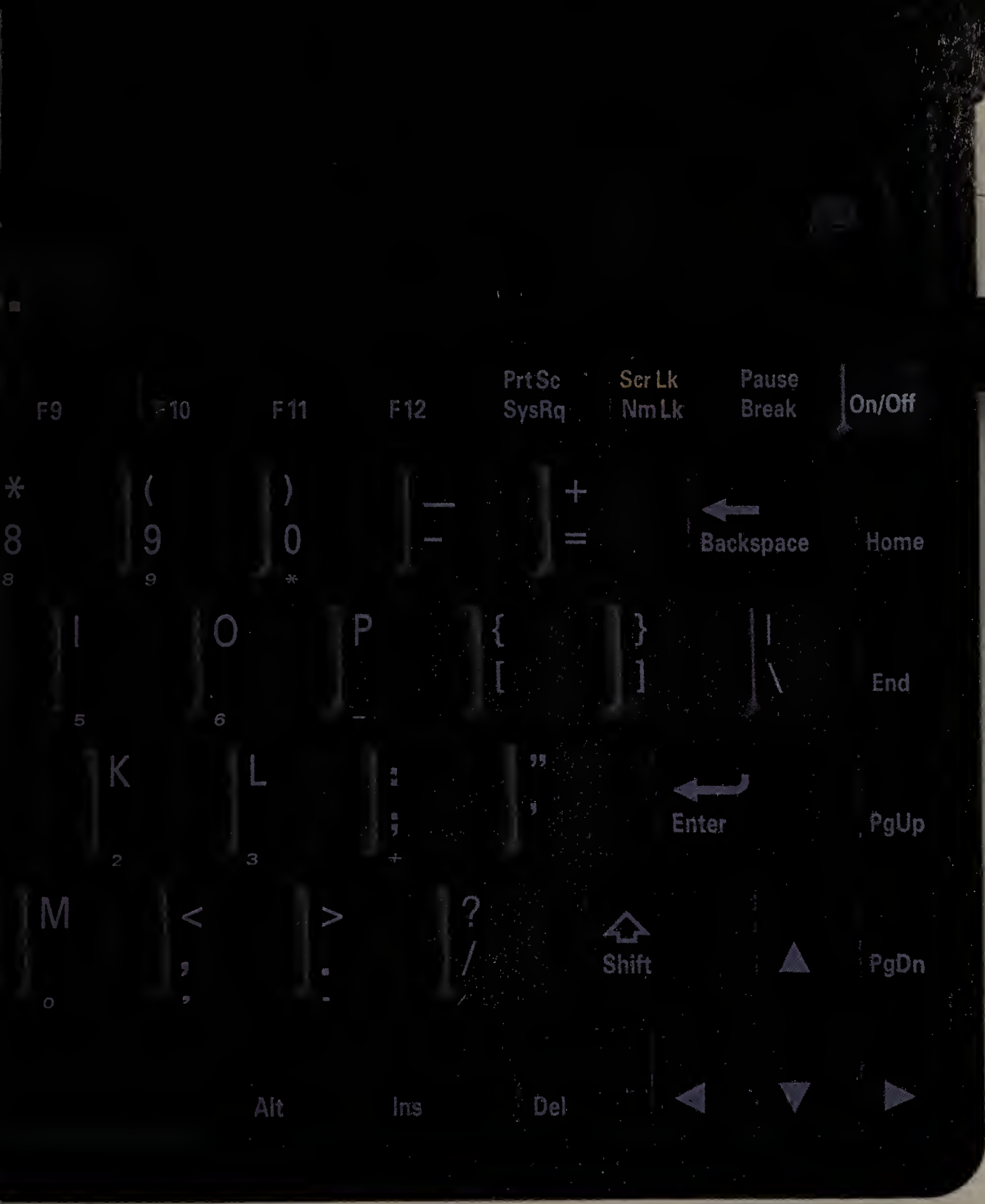
Built-in mouse saves space, works anywhere. Press a button. Out comes the mouse. It's not a ball or a stick. There's nothing extra to connect. It's a genuine mouse. And it pops up to make it as easy to handle as the ones people are used to working with. Which helps make working on the road as productive as in the office.

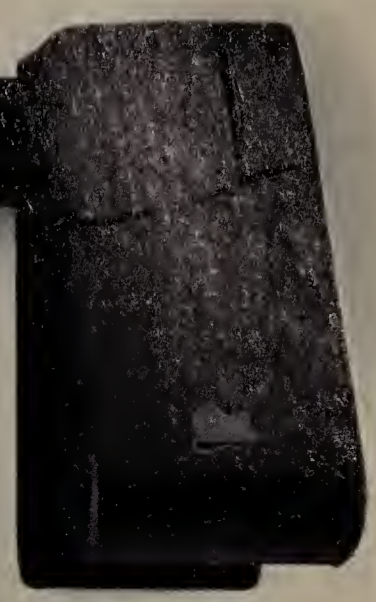
MICROSOFT® WINDOWS™

Microsoft® applications built into ROM. Being built into ROM makes all the difference. It means Microsoft Word, Excel and Windows™ 3.1 come up instantly on the 9-inch LCD screen. No disk space wasted. No time lost booting. Or going in and out of applications. Instead, hit one function key and you're in business.

To add more MS-DOS® or Windows-compatible software, just load away.

It turns on instantly in the same place it's turned off. Although this super-portable turns completely off to save battery life, it keeps track of the last screen. And that's where it turns on again. It doesn't even have to boot up.





"The HP OmniBook 300's mouse is the single best one since the desktop mouse."

— *Jeffrey Henning, Industry Analyst BIS Strategic Decisions*

"Finally, a smaller notebook without compromises. Kudos for HP!"

— *Randal Giusto, Senior Analyst, Workgroup Technologies*

"HP clearly has the lowest weight in a Windows machine and pretty snappy performance."

— *Kimball Brown, V.P., InfoCorp*

"Having applications in ROM should help tremendously with both freeing up disk space and improving battery life."

— *Janet Cole, Industry Analyst, Dataquest*

Book 300 Superportable PC.

The HP OmniBook 300 can also be an organizer. An appointment and address book. An alarm clock. A calendar. A calculator. A link with the office PC. With options, a fax and an e-mail terminal.

The price to lighten the workload? Just $1,950* for the hard disk model. $2,375* for the flash disk model.

For more information or the name of your nearest HP OmniBook 300 dealer, call 1-800-443-1254, Dept. 236. It's going to make a lot of workloads lighter. Including yours.

HEWLETT PACKARD

secondary cache RAM. It also comes with two VESA local bus slots, populated with an IDE hard drive adapter and a Genoa Windows video controller.

Netis leans toward the minimum on most peripherals—a 14-inch monitor, a 9600/2400 Class II internal modem from Zoltrix, and an 8-bit sound card. The 256MB hard drive might be too small for multimedia mavens, and the 1MB of DRAM on the video board is both slower and smaller than you'll find in some other systems. The quality of support and the service policies were above average. We found tech support knowledgeable and quick to pick up the phone. While the 1-year warranty is a minimum these days and on-site service costs a steep $100, Netis's toll-free support includes Saturdays, and you get a 30-day money-back guarantee and quick 2-day turnaround on repairs.

If we were looking for the cheapest complete-office PC, Netis's submission would certainly rank near the top. However, our aim was to find as much machine as possible for $4000. This system from Netis is without a doubt a solid machine with an alluring price, but its combination of features didn't give it the punch it takes to be a Best Buy. If you're looking for a high-performance do-all PC with a low price, we'd suggest that you check out the system from Keydata instead.

Polywell Poly 486-66VZ

VITAL STATISTICS

Direct price: $3995
PROS: Fastest system in review, voice mail, excellent service policies
CONS: Messy interior layout
Contact: Polywell Computers, 800/999-1278, 415/583-7222
Reader service no. 628

The PCs in this review will do pretty much anything you ask of them, but this system from Polywell is the cream of the crop. It's the most complete PC we've seen in this or any other review, such a powerful combination of performance and peripherals that it's an obvious choice as the top Best Buy.

First of all, the Polywell is the fastest system here. It's particularly well suited to DOS applications; in the BAPCo test suite, it was fastest in five out of six types of applications (word processing, spreadsheets, database managers, desktop publishing, and graphics); the only section it didn't ace was software development, in which it placed second, 13 percent slower than the Tri-Star. It wasn't slow in our Windows suite either; while the Gateway was the fastest Windows system tested, Polywell placed second.

Second, this system has all the hardware we requested and then some. The box includes a Media Vision Spectrum Multimedia Sound Card 16, a Texel CD ROM drive, and, best of all, The Complete PC's Complete Communicator, a combination voice-fax-modem. The system also comes with a 340MB Western Digital hard drive connected to a local bus caching controller, and an Orchid Fahrenheit VA/VLB local bus video board. If all of that isn't enough for you, two of the system's five 16-bit slots are still free, and there's a 238-pin ZIF socket for upgrading the CPU with Intel's forthcoming OverDrive for DX2.

Reason number three: Polywell offers some of the best service in the industry. The system is backed by a 24-month warranty. When we called to check tech support, the support staff picked up the phone quickly, and their responses were right on the money.

Finally, you get all this for $3995. That includes a mixed bag of software, ranging from The Complete Communicator (for DOS and Windows) to Chessmaster 3000 (which could perhaps help you sharpen your strategic skills). We can't fault the Polywell for being more expensive than some systems in the review; we gave companies a $4000 limit to work with, and Polywell used almost all of it.

Okay, we admit the system has a couple of flaws—it's an unholy mess of wires inside, you have to open a door on the front panel to turn the thing on, and on-site service costs $75 per year. But this is one impressive package, including just about everything we had in mind. If you want to set up an office with one easy purchase, this Polywell is your Best Buy.

Tandy 466 DX2

VITAL STATISTICS

Direct price: $3825
PROS: Speaker/amplifier unit
CONS: Bundled with Windows 3.0
Contact: Local Radio Shack dealer, or Tandy headquarters, 817/390-3011
Reader service no. 629

When it came to assembling a complete PC, we had great expectations for Tandy. After all, we figured, a company with so much expertise in different kinds of electronics should have no problems putting it all together in one box. Also, Tandy recently introduced the Sensation series, multimedia PCs designed specifically for the home market. Too bad the system it sent us wasn't a sensation; while it had all the features we asked for, somehow the whole was less than the sum of its parts.

We give Tandy credit for its fine job of integrating components. The video controller adapter and hard drive are both on the motherboard, the latter connected to a 256MB Western Digital drive. Tandy accommodated our hardware requests with its own name-brand sound board, CD ROM drive, and fax-modem; the system also comes with a speaker-amplifier unit that sits under the monitor. Strangely, the system arrived with Windows *3.0* installed. When we called to see if this was an error, the company specifically confirmed that Windows 3.0 was the version it was including with this system. We installed our own copy of Windows 3.1 for testing.

Unfortunately, although this system's performance isn't what you'd call slow, it is 3 percent slower than the average DX2-66. It ran ahead of the pack in our Windows tests but was fully 20 percent slower than the average 66 in the BAPCo suite.

Speed on the Desktop

	Excel 4.0	Freelance for Windows 1.0	Word for Windows 2.0	Paradox 3.5 in DOS window	BAPCo SYSmark92
Polywell Poly 486-66VZ*	1:20	2:19	1:44	1:53	207
Gateway 4DX2-66V	1:23	1:42	1:41	2:13	153
Axik Ace Cache BusinessPro*	1:36	2:25	1:49	2:13	177
ALR Evolution IV MPC 4DX2/66 240	1:42	1:59	1:49	2:05	150
Tri-Star Tri-Win Multimedia System	1:33	2:28	1:49	2:32	158
NEC Image 466	1:19	1:51	1:37	2:48	135
Duracom DeskSaver 486/66DX2	1:42	2:43	1:56	2:30	169
Keydata 486-Multimedia*	1:33	2:24	1:45	2:18	139
Micron 466VL Magnum*	1:27	2:07	1:39	2:44	125
Netis N466 VL/MPC	1:46	2:15	1:55	2:41	134
AST Advantage Plus 486DX2/66*	1:40	2:43	1:56	2:33	133
IBM PS/ValuePoint Model 6384-WS9	1:52	2:34	2:02	2:46	134
Compudyne 486DX2/66 Mini-Tower	2:14	2:41	2:33	2:26	133
Tandy 466 DX2	1:52	3:00	2:04	2:55	116
Eltech Model 4660VB	1:58	2:24	2:44	5:54	155
Blackship BLK 486/50LB	2:08	2:46	2:47	2:53	114
Compaq Deskpro 4/33i	2:09	3:16	2:27	2:35	111
Insight 486-33 VL Multimedia Office	2:10	3:27	2:25	3:03	113
Tangent Black Box M440	2:23	3:34	2:50	2:52	105
DFI Model 466 MPC	2:14	2:59	2:46	3:24	99
Compaq ProLinea CDS	2:42	3:30	3:30	3:59	91

*Best Buy

Systems are arranged in order of overall speed, from fastest at top to slowest at bottom. Test results are in minutes:seconds (lower is better) except for the BAPCo results, which are given in number of scripts executed per hour (higher is better).

Methodology Systems were tested in the configurations specified in the Features Comparison table. If we had to install Windows ourselves, we performed the program's default installation. We configured Windows on each system with a Hewlett-Packard LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We loaded the test applications, test files, the scripts necessary to automate testing, and Microsoft Test (automation software).

Excel 4.0 We perform several data extracts; build and format a financial statement and print it; and open a mortgage analysis, scroll, move blocks, change the interest rate, print preview the statement, and save it.

Freelance for Windows 1.0 We load a single-page starter file containing a United States map, with each state a separate object. Then we build a six-page presentation using charts and preview it five times with different effects. Finally, we save the presentation to disk.

Word for Windows 2.0 We use the spelling checker and scroll through a 27-page document; create, format, print, and save a single-page business letter; and open a business proposal, add a paragraph, then preview and print it.

Paradox 3.5 in DOS window We perform a variety of data entry, record searching, and updating tasks. Then we generate reports against a simple customer list.

BAPCo SYSmark92 We run a scripting program that loads common database, desktop publishing, presentation graphics, software development, spreadsheet, and word processing applications and executes a variety of typical tasks with each. The following software packages are used: Aldus PageMaker 4.0, dBASE IV 1.1, Harvard Graphics 3.0, 1-2-3 3.1, Microsoft C 6.0, Microsoft Excel 3.0, Microsoft Word for Windows 2.0, Paradox 3.5, Quattro Pro 3.0, and WordPerfect 5.1.

Data based on tests designed and conducted by the PC World Test Center except the BAPCo SYSmark92, which is an industry-standard test designed by the Business Application Performance Corporation. All rights reserved.

TO DESIGN OUR NEW MOUSE, WE STARTED BY READING PALMS.

In relentless detail, we studied hands of all dimensions.

We consulted professors of kinesiology, engineers, ergonomists and computer users. We used digital fiber optics to analyze the human hand. We followed it in motion.

The result is a new Microsoft® Mouse that is, well, anatomically correct. Uncommonly comfortable.

The palm is perfectly supported. Left or right handed, the grip is comfortable. Fingertips fall naturally into place. A click feels just right.

This mouse even looks good. Intriguingly asymmetrical. Yet it somehow reminds you of the gentle curves of a human form.

Did we mention that it also has some innovative new software features? They allow you to customize the mouse, so it works the way you like to work.

Try the new Microsoft Mouse. If you're not comfortable, we'll refund your money. Guaranteed. Details are on the box, which you can quickly get your hands on at a computer store near you.

Microsoft
Making it easier

© 1993 Microsoft Corporation. All rights reserved. Printed in the USA. Microsoft is a registered trademark of Microsoft Corporation.

The Tandy's price isn't anything to shout about either. At $3825, it's under our $4000 limit, but so are most of the systems here, and most provide a better selection of software; Tandy includes Microsoft Works for Windows and MTEZ communications software for DOS. The company backs up the system with some ordinary service and support. You can call Tandy direct, but it was a bit sluggish to answer our calls (hold times ranged from 3 to 8 minutes), and it's a toll call to boot. The company prefers that buyers route all questions and service requirements through dealers. On the plus side, you do get a year of free on-site service. We wish we had better news for Tandy, but the competition is pretty fierce. If you're looking for a complete solution, we'd advise you to look elsewhere.

Tangent Black Box M440

VITAL STATISTICS

Direct price: $3749
PROS: Fast CD ROM drive
CONS: Low performance, long delays in tech support
Contact: Tangent Computer, 800/800-6060, 415/342-9388
Reader service no. 630

The M440 could be the Darth Vader of this roundup. Everything—system box, monitor, keyboard, speakers, even the mouse—is a striking jet black, giving this minitower the aura of the ultimate lean, mean computing machine.

Indeed, the M440's design is meant to strike fear into the hearts of its competitors. For starters, it comes with a 238-pin, ZIF CPU-upgrade socket, 8MB of RAM expandable to a hefty 128MB, and 256K of secondary cache RAM expandable to 1MB. Its sleek Sony 10-watt speakers deliver more than twice the punch of the 4-watt speakers found on most other systems. Its CD ROM drive is rated for a speedy 280 ms access time and 300K-per-second data transfer rate and a hefty 256K buffer, all girding it for motion-video action. It's also the only PC in this review to offer three types of expansion slots—EISA, ISA, and VESA local bus—and it has one of the most solid and sensible system board layouts. For all that, the M440 has a surprisingly inviting price.

With all this to recommend it, why did this machine fall in the battle for the Best Buy? Several factors contribute. Although the company offers solid support policies and answered all our tech questions correctly, it lost points on delays in responding that ranged from 45 minutes to 3 hours. Even though the 240MB hard disk is capacious by most standards, it's one of the smallest in this group. And while the video controller delivers 1280 by 1024 resolution, the 14-inch monitor is too small to display more than 1024 by 768 video comfortably.

Where the M440 really falters, however, is at its core. This PC is based on Cyrix's new 40-MHz Cx486S-40 processor—powerful, but just not able to keep up with the 66-MHz CPUs and their 8K of built-in cache (the 486S-40 has only 2K) and built-in math coprocessors. While the M440 flies high, its performance was eclipsed by this group of powerhouses, bringing this potential Best

FEATURES COMPARISON

Complete PCs: Office Replacements?

● Yes
○ No

Standard features	ALR Evolution IV MPC 4DX2/66 Model 240	BEST BUY AST Advantage Plus 486DX2/66	BEST BUY Axik Ace Cache BusinessPro	Blackship BLK 486/50LB	Compaq Deskpro 4/33i	Compaq ProLinea CDS	Compudyne 486DX2/66 Mini-Tower	DFI Model 466 MPC	Duracom DeskSaver 486/66DX2
Selling price as of 5/3/93[1]	$4027	$4627	$3998	$2595	$3653	$2681	$3999	$3699	$3572
CPU	486DX2-66	486DX2-66	486DX2-66	486DX-50	486DX-33	486SX-25	486DX2-66	486DX2-66	486DX2-66
Motherboard manufacturer	ALR	AST	Axik	unlabeled	Compaq	Compaq	Compudyne	DFI	Duracom
BIOS	Phoenix	Mylex	AMI	AMI	Compaq	Compaq	AMI	AMI	AMI
Chip set	OPTi	OPTi	SIS	SIS	Compaq	VLSI	OPTi	Contaq	UMC
238-pin CPU-upgrade socket	○	○	●	●	○	○	●	○	○
ZIF socket	●	○	●	●	○	○	○	○	○
Installed/maximum RAM (MB)	8/52	8/32	8/32	8/32	8/32	8/32	8/32	8/32	8/32
Secondary cache installed/maximum (K)	256/256	64/256	256/256	256/1024	64/64	0/0	256/256	128/256	256/256
Case style	compact	minitower	tower	compact	compact	compact	minitower	compact	compact
Externally accessible drive bays/number free									
3½ inch	1/0	1/0	2/1	1/0	1/0	1/0	0/0	1/1	1/0
5¼ inch	2/1	3/0	3/1	2/0	1/0	1/0	4/2	2/0	3/1

[1] All systems include super VGA and color monitor, a keyboard, a mouse, DOS 5.0 or 6.0, and Windows 3.1; they are otherwise configured as specified.

Selling price is either direct or the average price based on calls made to multiple dealers.

Buy down to a below-average overall rating. If you have a spare 486DX2-66 CPU you can swap in, give the M440 serious consideration; otherwise we cannot recommend it.

Tri-Star Tri/Win Multimedia System

VITAL STATISTICS

Direct price: $3995
PROS: Fifth-fastest system here, 17-inch monitor
CONS: Nothing major
Contact: Tri-Star Computer Corp., 800/800-7668, 602/961-3401
Reader service no. 631

Sometimes the difference between a Best Buy and an also-ran is decided by a few pesky details. That's the case with this system from Tri-Star. Change just a couple of its specs, and it would slip into our winner's circle. Even though it didn't make Best Buy, it's one of the most attractive systems here.

Start with its fifth-place performance finish. It did particularly well in the BAPCo suite, where it was 11 percent faster than your average 66, with especially good scores in the spreadsheet sections. It's also a fast Windows system, only 20 percent slower than the Gateway for overall Windows performance.

Tri-Star also did a good job of adding value with the system's peripherals. One prime example is the 17-inch high-quality MAG monitor, which makes the 14- and 15-inch displays supplied by most vendors look puny. This big display is hooked up to a Cardinal WarpSpeed video card. Tri-Star took further advantage of its VLB motherboard, by putting a caching controller equipped with 2MB of RAM into a second VLB slot. This controller attaches to a 256MB Western Digital hard drive. Also included are Media Vision's Pro AudioSpectrum 16 sound card connected to a Texel CD ROM drive.

The remarkable thing is, Tri-Star accomplished all this without going over our price ceiling. The company also backs the system up with some good service and support, which includes a 2-year warranty and a year of free on-site service. Tri-Star's tech support staff was extremely responsive to our anonymous calls, answering their phones quickly and our questions accurately.

So why isn't this system a Best Buy? Blame the little things. Tri-Star uses a 128K secondary cache instead of the 256K most other vendors supply. When the one year of free on-site service is up, the company guarantees only a 7-day turnaround on factory repairs. The tech support lines are closed on weekends. Finally, Tri-Star's software bundle doesn't compare with what you get from some other companies: In addition to basic communications and Publish It desktop publishing software, you get Marketing Master 1992, the Time Magazine Almanac, and a business atlas, but nothing as nice as Microsoft's Office or Bookshelf, which other vendors included.

We admit our complaints are minor, but they're enough to keep this machine out of the top five. If you like the speed and the 17-inch monitor and don't care about the software bundle, you should definitely consider this system.

	Eltech Model 466DVB	Gateway 4DX2-66V	IBM PS/ValuePoint 466DX2/D Model 6384-WS9	Insight 486-33 VL Multimedia Office	BEST BUY Keydata 486-Multimedia WindowStation	BEST BUY Micron 466VL Magnum	NEC Image 466	Netis N466 VL/MPC	BEST BUY Polywell Poly 486-66VZ	Tandy 466 DX2	Tangent Black Box M440 System	Tri-Star Tri-Win Multimedia
	$3449	$4007	$4000	$3999	$2795	$3999	$4475	$2420	$3995	$3825	$3749	$3995
	486DX2-66	486DX2-66	486DX2-66	486DX-33	486DX2-66	486DX2-66	486DX2-66	486DX2-66	486DX2-66	486DX2-66	Cx486S-40	486DX2-66
	Prima	Micronics	IBM	Asus	Asus	Micronics	OEM	Netis OEM	Intercom	Tandy	NICE	Area
	AMI	Phoenix	IBM	AMI	AMI	Phoenix	Phoenix	AMI	AMI	Phoenix	AMI	AMI
	SIS	Micronics	IBM	SIS	SIS	MIC	C&T	SIS	SIS	Opti	Hint	UMC
	○	○	●	●	●	●	●	○	●	○	●	○
	optional	●	●	●	●	●	●	○	●	○	●	○
	8/32	16/64	8/64	8/32	8/32	8/64	16/64	8/32	8/32	8/40	8/128	8/32
	256/256	256/256	0/256	256/256	256/256	256/256	256/256	128/256	256/256	64/256	256/1024	128/256
	tower	tower	compact	tower	tower	compact	desktop	compact	tower	compact	minitower	tower
	2/1	2/2	1/0	0/0	2/1	0/0	0/0	1/0	2/2	1/1	0/0	0/0
	4/2	4/0	2/1	6/3	5/3	3/2	2/0	3/1	3/1	2/1	3/0	4/1

Table continues on following pages

FEATURES COMPARISON

Complete PCs continued

● Yes
○ No
n/a = not applicable

	ALR Evolution IV MPC 4DX2/66 Model 240	BEST BUY AST Advantage Plus 486DX2/66	BEST BUY Axik Ace Cache BusinessPro	Blackship BLK 486/50LB	Compaq Deskpro 4/33I	Compaq ProLinea CDS	Compudyne 486DX2/66 Mini-Tower	DFI Model 466 MPC	Duracom DeskSaver 486/66DX2
Standard features cont'd									
Slots/number free									
32 bit	3/1[2]	0/0	2/1[3]	2/1[3]	0/0	0/0	1/0[3]	2/1[3]	0/0
16 bit	3/1	6/3	5/2	3/1	4/2	4/2	5/3	4/2	6/1
8 bit	0/0	1/1	0/0	2/2	0/0	0/0	0/0	2/1	1/0
Ports: parallel/serial/mouse/SCSI	1/2/1/0	1/2/0/0	1/2/1/0	1/2/0/0	1/1/1/1	1/2/1/0	1/2/0/0	1/2/0/1	1/2/0/1
Hard disk[5]	256MB Western Digital	340MB Western Digital	240MB Quantum	240MB Quantum	240MB Quantum	240MB Compaq	420MB Western Digital	340MB Western Digital	340MB Western Digital
Drive adapter	integrated IDE	integrated IDE	ISA IDE card	VLB IDE card	integrated IDE	integrated IDE	integrated IDE	ISA IDE card	ISA IDE card
Caching controller RAM (MB)	n/a	n/a	1	n/a	n/a	n/a	n/a	n/a	4
1.2MB/1.44MB floppy drives	0/1	1/1	1/1	1/1	0/1	0/1	0/0	1/0	1/1
Combination floppy drives	0	0	0	0	0	0	1	0	0
Graphics adapter	ALR Tricombo	Western Digital Paradise Accelerator	Diamond Stealth 24 VLB	Orchid Fahrenheit VA/VLB	integrated Compaq QVision	integrated Tseng ET4000/W32	Diamond Viper VLB	Genoa Windows VGA 24 8500 VL	DFI VG-8000WH
Memory	2MB VRAM	1MB DRAM	1MB DRAM	1MB DRAM	1MB DRAM	1MB DRAM	2MB VRAM	1MB DRAM	1MB DRAM
Monitor	ALR TE 1422	AST SVGA	Micro Scan 3E	KFC	Compaq 15FS	Compaq 15FS	MAG MX17H	KFC Multi-Scan VGA	Relisys RE 1422
Screen diagonal (inches)	14	14	14	15	15	15	17	15	14
Dot pitch (mm)	0.28	0.28	0.28	0.28	0.28	0.28	0.26	0.28	0.28
Sound card	Media Vision Pro Audio-Spectrum 16	Media Vision Fusion CD16	Media Vision Pro Audio-Spectrum 16	CreativeLabs Sound-Blaster 16	Media Vision Pro Audio-Spectrum 16	Media Vision Pro Audio-Spectrum 16 LMSi	Media Vision Fusion CD 16	Microsoft Windows Sound System	Microsoft Windows Sound System
Highest sampling resolution (bits)	16	16	16	16	8	16	16	16	16
Maximum sampling rate (kHz)	44	22	44	44	44	44	44.1	44	44
CD ROM drive	Sony CDU31A-02	Sony CDU31A	Texel DM-3024	unlabeled	unlabeled	Compaq	Sony CDU31A	Toshiba XM-3401B	Toshiba XM-3401B
Built-in buffer (K)	64	64	64	64	32	32	64	256	256
Average access time (ms)	490	490	265	390	290	375	490	200	310
Data transfer rate (K per second)	150	150	300	150	300	150	150	330	330
Fax-modem	unlabeled	AST Data/Fax Modem	Macronix MaxFax[6]	Ripe Hitek RipeFax02M	Compaq	Compaq	National Semi-conductor TyIN 2000	unlabeled	Zoltrix Fax 400
Speed (fax/data) (bps)	14,400/ 14,400	9600/ 2400	14,400/ 14,400	9600/ 2400	9600/ 2400	9600/ 2400	9600/ 2400	9600/ 2400	14,400/ 14,400
Service and support									
Warranty (months)	15	12	12	12	36	36	12	12	12
On-site service price for first year	$9.95	free	free	free	free	free	free	free	free[7]
30-day money-back guarantee	●	●	●	●	○	○	●	○	○
Turnaround policy (days)	2	2	2	2	3	2	2	3	2
Toll-free support number	●	●	●	●	●	●	●	○	●
Daily hours	12	24	9.5	9	24	24	13	9	11
Weekend support	●[8]	●	●[8]	○	●	●	○	○	○
BBS support	●	●	●	●	●	●	●	●	○
Fax support	●	●	●	●	●	●	●	●	○

[2] 2 VLB, 1 proprietary local bus slot total; 1 VLB slot free. [3] VLB. [4] 1 EISA, 2 VLB total; 1 EISA free. [5] Size per manufacturer. [6] External. [7] At dealer's discretion.

	Eltech Model 4660VB	Gateway 4DX2-66V	IBM PS/ValuePoint 466DX2/D Model 6384-WS9	Office Multimedia Insight 486-33 VL	BEST BUY Keydata 486-Multimedia WindowStation	BEST BUY Micron 466VL Magnum	NEC Image 466	Netis N466 VL/MPC	BEST BUY Polywell Poly 486-66VZ	Tandy 466 DX2	Tangent Black Box M440	Tri-Star Tri-Win Multimedia System
	2/0[3]	2/1[3]	1/1[3]	2/0[3]	2/0[3]	2/0[3]	0/0[3]	2/0[3]	2/0	0/0	3/1[4]	3/1[3]
	4/2	6/3	4/3	5/3	7/6	5/3	4/3	4/3	5/2	5/2	5/3	3/2
	1/1	0/0	0/0	0/0	0/0	0/0	0/0	2/1	0/0	0/0	0/0	1/0
	1/1/0/0	1/2/0/0	1/2/1/0	1/2/0/0	1/2/0/0	1/2/0/1	1/2/1/1	1/2/0/1	2/2/0/0	1/2/1/0	1/2/0/0	1/2/0/0
	340MB Western Digital	340MB Western Digital	340MB Western Digital	250MB Western Digital	240MB Maxtor	213MB Maxtor	340MB Western Digital	256MB Western Digital	340MB Western Digital	256MB Western Digital	240MB Seagate	256MB Western Digital
	VLB IDE card	integrated VLB IDE	integrated IDE	VLB IDE card	VLB IDE card	VLB SCSI card	integrated IDE	VLB IDE card	VLB IDE card	integrated IDE	VLB IDE card	VLB IDE card
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2	n/a	n/a	2
	1/1	1/1	0/1	1/1	1/1	0/0	0/1	1/1	1/1	0/1	0/1	1/1
	0	0	0	0	0	1	0	0	0	0	0	0
	Genoa Windows VGA 24 8500 VL	ATI Graphics Ultra Pro	integrated S3 801	STB Power-Graph VL-24	STB Power-Graph VL-24	Diamond Viper VLB	integrated Tseng ET4000/W32	Genoa Windows VGA 24 8500 VL	Orchid Fahrenheit VA/VLB	integrated Western Digital 90C31	Hercules Graphite VL	Cardinal WarpSpeed
	1MB DRAM	1MB VRAM	1MB DRAM	1MB DRAM	1MB DRAM	2MB VRAM	1MB DRAM	1MB DRAM	1MB DRAM	1MB DRAM	1MB VRAM	2MB VRAM
	KFC	CrystalScan 1572FS	IBM PS/ ValuePoint	Philips Fast-Refresh 17	CTX CPS-1560	MAG MX15H	NEC 4FG	View Magic CA-1460	ADI MicroScan 4A SM-5515	Tandy VGM-450	Tangent CM-1430	MAG MX17H
	17	15	14	17	15	15	17	14	15	14	14	17
	0.26	0.28	0.28	0.26	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.26
	Creative Labs Sound-Blaster Pro	Microsoft Windows Sound System	Creative Labs Sound-Blaster 16	Media Vision Pro Audio-Spectrum 16	Aztech Sound Galaxy NX Pro	Creative Labs Sound-Blaster Pro	Media Vision Pro Audio-Spectrum 16	Creative Labs Sound-Blaster Pro	Media Vision Spectrum Multimedia Sound Card 16	Creative Tech Tandy Sound Board	Media Vision Pro Audio-Spectrum 16	Media Vision Pro Audio-Spectrum 16
	8	16	16	16	16	8	16	8	16	16	16	16
	44	44	44	44	44	44	44	44	44	44	44	44
	unlabeled	Gateway 2000	unlabeled	Texel DM-3024	unlabeled	Chinon CDS 535	NEC MultiSpin 84	unlabeled	Texel DM 3024	Tandy CDR-1100	NEC CDR 83J	Texel DM 3024
	64	32	64	64	64	256	256	64	64	n/a	256	64
	390	375	320	265	350	280	280	390	265	375	280	265
	171	150	300	300	175	300	300	171	300	153.6	300	300
	The Complete PC Complete Communicator	Gateway 2000 Telepath Data/Fax	Cardinal MB2650SR	Boca MB9624FM	Accex 9624 Fax Modem	QuickTel 1414HV	Zoom	Zoltrix 96/24	The Complete PC Complete Communicator	Tandy	unlabeled	unlabeled
	9600/ 2400	14,400/ 9600	9600/ 2400	9600/ 2400	9600/ 2400	14,400/ 14,400	9600/ 2400	9600/ 2400	9600/ 4800	9600/ 2400	9600/ 2400	9600/ 2400
	12	12	12	12	18	12	36	12	24	12	12	24
	$69	free	free	none	free	free	free	$100	$75	free	free	free
	●	●	●	●	●	●	○	●	●	●	●	●
	2	n/a	n/a	n/a	2	2	7	2	3	2	3	7
	●	●	●	●	●	●	●	●	●	○	●	●
	9	18	24	24	11	11	12	10	9	9	9	11
	○	●[8]	●	●	●[8]	●[8]	○	●[8]	●[8]	○	○	○
	○	●	●	○	○	○	●	○	○	●	●	●
	●	●	●	●	●	○	●	●	●	●	●	●

[8] Saturday only.

New!

Instant Reprints via Fax

Call the PC World Reprints-by-Fax Hotline for instant delivery of the information you need.

Need the latest hot tips for Windows *now*? Want backup for a presentation on mobile computing you're giving this afternoon? Looking for a key software article you missed in *PC World*? In just 60 seconds the information you need can be in your hands!

PC World's new Reprints-by-Fax Hotline delivers the full text of key *PC World* articles *instantly* via fax wherever you are, around the clock.

Reprints-by-Fax are available in five key subject areas (see the complete list below). For the subject category you choose (one category per call), you'll receive the three most recent articles specially chosen by our editors to provide you with actionable information you can use now to save time and money and be more productive.

Here are the categories available now through the Reprints-by-Fax Hotline:

#001 Dress Up Your System for Today's Software
- Are Upgrades Worth It? (2/93)
- 486s for $1250 (6/93)
- Ramping Up to Windows (1/93)

#002 200 Software Tips for Everyone
- 50 Super Spreadsheet Tips (6/93)
- 75 Windows and DOS Speedup Tips (1/93)
- 75 Tips for Windows and DOS 6.0 (7/93)

#003 Getting the Most for Your Software $$
- Great Software Under $50 (4/93)
- Work Smarter, Not Harder: 67 Timesavers for 16 Software Applications (5/93)
- Search and Destroy: Antivirus Software (5/93)

#004 Taking It on the Road
- Tips for a Productive Trip (7/93)
- Computers for the Mobile Exec (7/93)
- What's the Easiest Notebook to Use at 30,000 Feet? (7/93)

#005 Consumer Alert!
- How to Survive if Your PC Maker Doesn't (6/93)
- Danger at Your Fingertips (5/93)
- Is Your New Software Secondhand? (3/93)

Ordering is easy 24 hours a day:

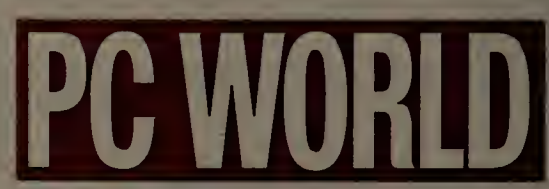
To order, simply call our automated Reprints-by-Fax Hotline and enter your category choice as directed by the system. For just $7.95, you'll receive *three* complete articles (each 3–7 pages) delivered to the fax machine you specify, within minutes of your call. (One category request per call, please; touchtone telephone required.)

You can reach the Reprints-by-Fax Hotline two ways:

Call toll-free 1-800-234-0455, ext. 305.
The $7.95 per category will be charged to your Visa or Mastercard account.

Or, call 1-900-903-2972.
The $7.95 per category will be charged to your telephone bill. (Under 18 requires parental consent.)

Call now!



An IDG Communications Publication

Touchtone telephones only. Please have 3-digit category number, credit card number (800 toll-free calls only) and fax number ready when you call. Under 18 requires parental consent. Please call 415/243-0500 with questions or comments.

You challenged IBM to get with the times. First we created the PC Company. And now...

Introducing AMBRA. A new kind of standard doesn't equal average. *Speed* 66 MHz performance at 33 MHz prices.

AMBRA: Excellence and an entrepreneurial edge.

At AMBRA,™ we're proud of our IBM® heritage. Practical about it, too. We tap worldwide sourcing and purchasing power to get the latest and leading technology at volume prices — and pass the savings along to you. We run our computers through comprehensive testing to ensure industry-standard compatibility. And take full advantage of IBM's renowned service organization to offer the undisputed best in service and support.

On the other hand, we like our independence — and do business in our own new and nimble way. We move quickly and freely, building our computers not only with the best IBM technology, but that of other high-quality, industry-standard suppliers. We custom-configure to order — at no extra cost. From slimlines to desktops to towers to notebooks, we're positioned to outmatch the competition, point-for-point on price/performance. And we're prepared to deliver. To your door. In just a few days.

Interested? We invite you to keep reading, then give us a call. We'll send you the complete details on AMBRA computers and the services we offer, including our 30-day, money-back guarantee.[1,2]

company that's ***fast*** on its feet. Where
isn't synonymous with EXPEN$E. We deliver
Prepped for Pentium. Ready to ***RUN***.

AMBRA

AN very INDEPENDENT IBM SUBSIDIARY

We're raising industry standards by giving you more.

Combining the resources of IBM with the responsiveness of an independent company, AMBRA provides you with *immediate* access to the latest technology.

If it's industry-standard, we've got it for you now. If it's coming soon, we're positioned to get it — from advanced video to the latest microprocessors.

We're committed to giving you more for your money. Like extra cache at no added cost. Accelerated local bus without accelerated prices. Pentium™ upgradeability without a premium.

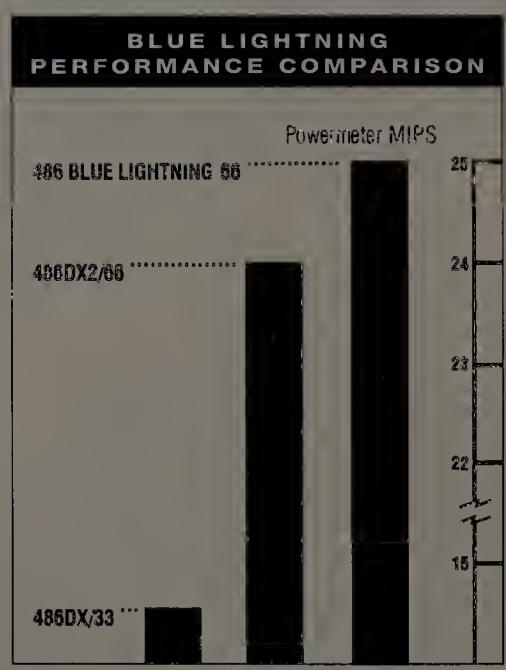
Along with extra features, we believe in giving you extra flexibility. Each and every AMBRA model is custom-built to your exact specs. With no penalty in terms of time or expense.

We offer hundreds of brand-name hardware, software and peripheral options — everything from Hayes® modems to Lexmark® printers. To make sure that every possibility is open to you.

All AMBRA computers carry a 30-day, money-back guarantee.[1,2] They're backed by onsite IBM service and round-the-clock support — the kind of service and support that never lets you down.

BLUE LIGHTNING: AN ELECTRIFYING AMBRA ADVANTAGE...

IBM's 486 Blue Lightning™ processor builds on the best features of Intel microprocessors, including performance, instruction set and upgradeability. IBM optimized the instruction set, added a 16KB internal cache, lowered power consumption and improved power management. The result: Blue Lightning doubles internal clocking to 66 MHz, while maintaining full 486 compatibility. AMBRA harnesses the power of Blue Lightning to deliver 66 MHz system performance at 33 MHz prices.



All processors were tested on the same IBM motherboard.
MIPS = millions of instructions per second.

Built to your order, exactly.
AMBRA will custom-configure any and every computer for you — and it won't cost you an extra day or an extra dime! You have your choice of chassis, processors and a full range of memory sizes. Hard and floppy disks, tape drives, CD-ROM drives, multimedia kits, and more. Plus high-quality, low-radiation AMBRA monitors, network cards, you name it. You get it all preinstalled, from a single source.

Preloaded software.
We automatically preload AMBRA computers with MS-DOS® 6.0 and Windows™ 3.1. Purchase any of our large collection of software, and we'll preload it for you at no additional installation charge.

True-blue service and support.
You're backed by a one-year, onsite warranty.[1] And you can count on 10,000 IBM technicians at 190 locations nationwide to deliver service within two days of your call, Monday through Saturday. Plus, you get toll-free support from IBM technical representatives 24 hours a day, 7 days a week.

Convenient payment options.
Our lines are open every weekday 8 am to 9 pm, and Saturday 10 am to 6 pm (ET). We accept American Express,® Visa® and MasterCard.® Purchase orders may be used by qualifying businesses.

Fast, to-your-door delivery.
We ship within three days of confirmation of your order. If, for any reason, we can't meet that deadline, we'll tell you up front — and give you a firm delivery date.

1 - 8 0 0 -

66 MHz performance at 33 MHz prices.

With Blue Lightning AMBRA models, you reap the benefits of 66 MHz system performance — at 33 MHz prices.

	AMBRA	GATEWAY	DELL
Model	486 Blue Lightning 66	486DX-33V	433/L
Internal clock	**66 MHz**	33 MHz	33 MHz
External clock	33 MHz	33 MHz	33 MHz
System case	Desktop	Desktop	Desktop
RAM	8MB	8MB	8MB
Cache	**256KB**	128KB	—
Floppy	One	One	One
Hard disk	340MB	340MB	340MB
Onboard SCSI	✔	—	—
Local bus	✔VESA	✔VESA	✔
Video	Win accel w/1MB	Win accel w/1MB	Win accel w/512KB
Color monitor	15" FST*	15" FST	15" FST
Pentium-ready	✔	✔	✔
DOS 6.0, Windows 3.1, mouse	✔	✔MS Works for Windows	✔
Network-ready	**Ethernet (10BaseT)**	—	—
Tech support	24 hours, 7 days/week from **IBM**	Mon-Fri, 6 am to midnight Sat, 9am-4pm	24 hours, 7 days/week
Warranty/Service	1 year **IBM onsite**	1 year onsite	1 year onsite
Price	**$2,079**	$2,025	$2,699

*Upgraded from 14" SVGA at no extra cost. See special offer.

Intel® Pentium, within your reach.

AMBRA is one of the few who can offer you Pentium today — and we offer it at a price you can afford.

	AMBRA	DELL
Processor	Intel Pentium 60 MHz 64-bit proc complex	Intel Pentium 60 MHz 64-bit proc complex
Bus type	EISA	EISA
System case	Desktop	Tower
RAM	8MB	8MB
Cache	256KB	256KB
Floppy	One	Two
Hard disk	**540MB SCSI**	500MB IDE
Onboard SCSI	✔**Dual 32-bit**	—
Local bus	✔VESA	✔
Video	**ATI™ Ultra Pro w/2MB DRAM**	Win accel w/512KB
Color monitor	15" FST*	15" FST
DOS 6.0, Windows 3.1, mouse	✔	✔
Tech support	24 hours, 7 days/week from **IBM**	24 hours, 7 days/week
Warranty/Service	1 year **IBM onsite**	1 year onsite
Price	**$4,259**	$7,566

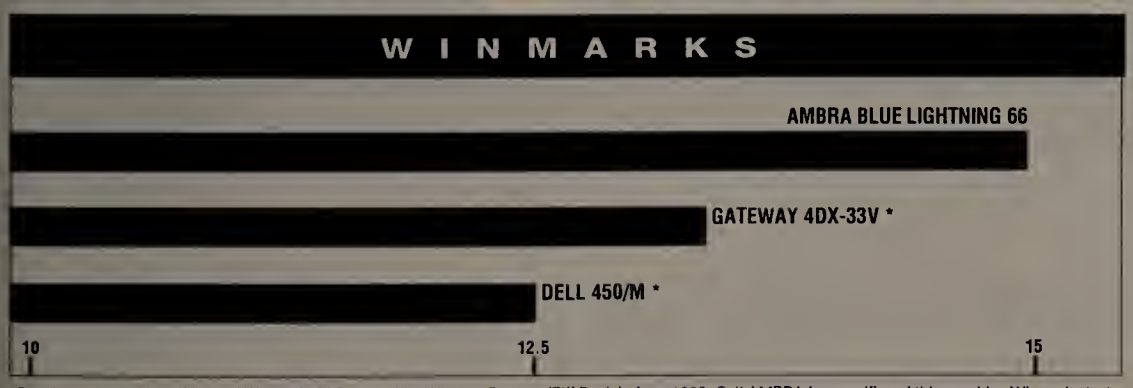
*Upgraded from 14" SVGA at no extra cost. See special offer.

Solid products, hot prices.

Competitive prices shouldn't mean mediocre machines. Example: AMBRA's low-cost Model S425SX. It puts you in touch with tomorrow's innovations. That's because it's Pentium-ready — and supports memory upgrades to 36MB. It features the upgradeable 486SX 25 MHz processor, cache to spare, a fast local bus, and Windows accelerator with 1MB video memory.

Extra compact design. Extra color.

At 6.4 pounds, our 486SX 25 MHz SL-enhanced notebook packs a lot of performance. You get 4MB of expandable memory; a 120MB hard disk; STN dual-scan, passive-matrix screen for vibrant color and easy mouse tracking; plus integrated fax/modem and built-in trackball. All for $2,449.



*Results measured in millions of Winmarks.™ Reported in *Window Sources* (Ziff Davis), June 1993. Call AMBRA for specifics of this graphics Winmarks test.

2 5 A M B R A

AMBRA custom-building lets you cover all the bases.

HERE ARE JUST A FEW MODELS WE'LL MOLD TO MEET YOUR NEEDS:

Model S450SL
- 486SLC2, 50 MHz
- 4MB RAM max: 16MB
- 64KB processor cache
- 3.5" floppy
- 125MB (14ms) hard disk
- Windows accelerator with 1MB video memory
- 14" VGA color monitor
- Slimline case
- 3 16-bit ISA slots
- MS-DOS 6.0, Windows, mouse

$1,199

Model S425SX
- 486SX, 25 MHz
- Intel Pentium-ready
- 4MB RAM max: 36MB
- 128KB processor cache
- 3.5" floppy
- 170MB (17ms) hard disk
- 2 VESA local bus slots
- Windows accelerator with 1MB video memory
- 14" SVGA LR color monitor
- Slimline case
- 3 16-bit ISA slots
- MS-DOS 6.0, Windows, mouse

$1,339

Model S433DX
- 486DX, 33 MHz
- Intel Pentium-ready
- 4MB RAM max: 36MB
- 128KB processor cache
- 3.5" floppy
- 240MB (15ms) hard disk
- 2 VESA local bus slots
- Windows accelerator with 1MB video memory
- 14" SVGA LR color monitor
- Slimline case
- 3 16-bit ISA slots
- MS-DOS 6.0, Windows, mouse

$1,689

NC425 SL Notebook
- 486SX, 25 MHz, SL-enhanced
- Dual-scan STN color screen (640 x 480 x 256)
- Fax-modem 2400/9600 baud
- 4MB RAM max: 12MB
- 120MB hard disk
- 3.5" floppy
- 9.5" screen
- Integrated trackball
- 8.6" x 11.4" x 2.0", 6.4 lbs
- MS-DOS 6.0, Windows, MS Works for Windows

$2,449

Model D466BL/CD

An AMBRA Best Buy!

- 486 Blue Lightning 66 MHz
- Intel Pentium-ready
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" floppy
- 440MB (12ms) hard disk
- Onboard SCSI
- 2 VESA local bus slots
- Windows accelerator with 1MB video memory
- CD-ROM drive and software
- Media Vision 16-bit sound card
- Stereo speakers
- 17" Flat Square LR color monitor, NI
- Network-ready (Ethernet 10BaseT)
- Desktop case
- 5 16-bit ISA slots
- MS-DOS 6.0, Windows, mouse

$2,869
(For minitower, add $50)

Model D466BL
- 486 Blue Lightning 66 MHz
- Intel Pentium-ready
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" floppy
- 240MB (15ms) hard disk
- Onboard SCSI
- 2 VESA local bus slots
- Windows accelerator with 1MB video memory
- ★ 15" Flat Square LR color monitor, NI
- Network-ready (Ethernet 10BaseT)
- Desktop case
- 5 16-bit ISA slots
- MS-DOS 6.0, Windows, mouse

$1,979
(For minitower, add $50)

Model D466DX
- 486DX2, 66 MHz
- Intel Pentium-ready
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" floppy
- 340MB hard disk
- Onboard SCSI
- 2 VESA local bus slots
- Windows accelerator with 1MB video memory
- CD-ROM drive
- ★ 15" Flat Square LR color monitor, NI
- Network-ready (Ethernet 10BaseT)
- Desktop case
- 5 16-bit ISA slots
- MS-DOS 6.0, Windows, mouse

$2,599
(For minitower, add $50)

Model D466E/VL
- 486DX2, 66 MHz
- Intel Pentium-ready
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" floppy
- 540MB SCSI hard disk
- 2 VESA local bus slots
- ATI Ultra Pro Mach 32, 2MB DRAM
- ★ 15" Flat Square LR color monitor, NI
- Desktop case
- 7 32-bit available EISA slots
- MS-DOS 6.0, Windows, mouse

$2,969

Model DP60E/VL

A Pentium Powerhouse!

- Intel Pentium processor, 60 MHz
- 64-bit processor complex
- VESA local bus with 1 available slot
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" floppy
- 540MB SCSI hard disk
- Onboard dual 32-bit Fast SCSI
- ATI Ultra Pro Mach 32, 2MB DRAM
- ★ 15" Flat Square LR color monitor, NI
- Desktop case
- 7 available 32-bit EISA slots
- MS-DOS 6.0, Windows, mouse

$4,259

SPECIAL OFFER: GET THE BIGGER PICTURE!

★ Purchase any 66 MHz or Pentium model, and AMBRA upgrades your view — from the standard 14-inch SVGA to a 15-inch Flat Square color monitor. At no extra cost to you! Limited-time offer. Call for details.

[1] Warranty and 30-day guarantee information available through AMBRA. Please call 1-800-252-6272 for details regarding AMBRA's money-back guarantee and limited warranty. Copies of the terms of AMBRA's money-back guarantee are available upon request. One-year onsite service at no additional charge during warranty.
[2] Return shipping and insurance charges are the responsibility of the customer.

In Canada, call 1-800-363-0066

©1993 AMBRA Computer Corporation.
IBM is a registered trademark and Blue Lightning is a trademark of International Business Machines Corporation.
All other product names are trademarks or registered trademarks of their respective suppliers.
Offerings, prices and products are subject to change without prior notice. Prices do not include shipping.

Call 1-800-252-6272, Ext. 263

1-800-25 AMBRA

Circle 127 on reader service card

GEOFF SPEAR

MO Drives:

Storage for the Masses

With cartridges as portable as a floppy, as roomy as a hard disk, and safer than either, rewritable optical drives offer more benefits than ever. The price? As low as $1000 and falling.

In this era of graphical computing, there's no such thing as a large-enough hard drive. A single CAD, graphic design, or multimedia project can chew up tens or hundreds of megabytes. Or maybe you need to save successive versions of a job in case your boss or client says, "Let's go with it the way you had it two weeks ago." If you do any of these things, a 200MB hard drive is probably not large enough to hold your data files, and a 500MB hard drive will be full before you know it. **BY SCOTT SPANBAUER**

Best Buys

We selected the Ocean Microsystems Vista 256 and the Pinnacle Micro PMO-130 as our Best Buys for very different reasons. The Pinnacle drive boasts one of the lowest prices in the review, yet still managed great performance and ease of use.

The Ocean Vista 256 is more expensive, but it's also fast and easy to use. It has the bonus of twice the capacity of most of these MO drives.

Relax, IBM, and PLI finished a little behind our two Best Buys, mostly because of performance.

BEST BUYS go to the Ocean Microsystems Vista 256 and the Pinnacle Micro PMO-130 (top).

If you've hit that 500MB ceiling, it's time to consider a magneto-optical (MO) drive. MO drives combine high capacity with the convenience of a floppy disk—you can literally pop out that 128MB or 256MB cartridge and put it in your pocket. It'll be safe there, too, because the media is extremely durable.

The average street price for MO drives is $1700 (including SCSI interface boards, cables, software, and a cartridge) and can go as low as $1000. That might seem expensive, but even after adding the price for additional MO media, it's still competitive with the cost, if not the speed, of a 500MB hard disk (see "MOs Save a Lot When You Store a Lot"). Compared with other removable media storage solutions such as an Iomega Bernoulli drive or a SyQuest drive, MO drives perform just as well and, as your storage needs grow, become more economical. The SyQuest drive has a significant installed base in the prepress and publishing industry, however, so for compatibility's sake you might have to choose that over MO.

As your storage needs grow, magneto-optical drives become more economical than other removable-media storage solutions.

Magneto-optical drives are not a universal replacement for hard disks and tape drives, however. Running the software you use every day from an MO would definitely slow you down, and you wouldn't want to place a virtual memory "swap" file on one. But with the exception of performance, MO drives behave almost exactly like regular hard disks; installing and using an application you run infrequently on an MO cartridge is not out of the question, and an MO drive could stand in for a dead hard disk in a pinch.

You can also use an MO drive as a backup device, but you shouldn't buy it for that reason alone. A tape drive is about one-fifth the price of an MO drive, and the media is about one-third the price of an MO cartridge. But tape drives are also extremely slow—switching from one job to another and back again, as you would with an MO drive, could take hours. If you need quick access to lots of large data files, a personal MO drive is the best solution—and backing up your hard disk will cost you only another cartridge or two. But if all you need is a backup device, the economy of tape overrides its slower performanee.

Here Today, Here Tomorrow

The technology behind MO drives also offers a benefit that magnetic drives and tape can't: durability. While highly reliable, magnetic media—hard disks, floppies, or tape—are subject to physical wear and erasure by the magnetic fields radiated from telephones, monitors, airport metal detectors, and other equipment. MO disks, on the other hand, are relatively impervious to such environmental factors. As you can guess from the name, MO disks combine some characteristics of both magnetic and optical storage devices, but the MO drive's write head remains fairly distant from the disk, minimizing head crashes; and the data can be altered only by heating the media with a high-powered laser, oven, or building fire. Optical disk manufacturers rate the shelf life of an MO disk conservatively at 30 years.

We evaluated 12 3½-inch MO drives for this review—11 128MB units, and one 256MB drive. A new company, LaserByte Corporation, introduced its LB3128 MO drive too late for review. LaserByte claims to have a proprietary technology that greatly improves its drive's performance compared to other MOs. We were also unable to include the Liberty Systems' 256MB 115MO because the SCSI ports on two successive drives submitted for testing failed. In tests using only its parallel-to-SCSI adapter, it performed well. Although any one of the drives we reviewed could handle your needs, two are clearly best buys: Pinnacle's PMO-130 and Ocean's Vista 256.

All 12 MOs are external units, and two are intended to be portable. Most vendors sell internal units, which not only save

space on your desktop, they cost about $200 less as well. MO drives generate more heat, though, and draw more power than most hard disks. If you're already struggling to keep that 66-MHz 486 cool, you may be better off with an external unit.

The PC World Test Center put the drives through their paces, and I also installed each drive on two different systems—on one using my Adaptec 1542 SCSI adapter and EZ-SCSI software to determine general compatibility with an existing SCSI controller, and on the other using the adapter and software included with each drive. Two drives come with parallel and SCSI interfaces, and we attempted to test both.

A Drive for Every Desk

In choosing the right MO drive, first consider your valuable desktop real estate. If you're like me, you need room to spread out your work, and adding one more peripheral often means moving something else to a drawer or the floor. Drives that allow a choice of vertical or horizontal orientation are generally best at conserving space. The Relax Sierra 128 and Liberty 70MO are by far the smallest drives and could fit on top of even the most crowded desk.

And once a drive is on your desktop, you'll want controls and indicator lights that make it easy to use. Although only two drives offer it, a front-panel power switch is an obvious convenience. Maximum storage puts the Cachet System 6's switch almost out of reach below the SCSI cable connectors. Also, the SCSI ID selector—each device in a SCSI chain, including the SCSI adapter, must use a unique numeric SCSI identifier number between zero and seven—is mounted between the two connectors, making it difficult to change without unplugging one or both of the cables. Sony's RMO-S350 lacks a standard numeric SCSI ID selector, opting instead for toggle switches—a simple push-button or thumbwheel selector would be easier. All the drives have lights that indicate whether the drive is on and when it's writing to the disk. The Pinnacle PMO-130 has a third LED that lights while the drive's write buffer is still full, a nice extra that lets you know when it's safe to eject the disk. All the drives have emergency eject devices as well.

Most drives come with two standard 50-pin SCSI connectors, which give you maximum flexibility in attaching multiple SCSI devices to your adapter. The Liberty and Valitek are intended primarily as portable drives but they include only one SCSI connector. When connected to a standard SCSI adapter, each of these drives must be the last device in the daisy chain. Liberty does make a standard-configuration drive with two SCSI ports and no parallel interface, but they did not submit it for this review.

The two portables also have a parallel-port connector that allows you to attach the drive to your computer's parallel port and still use your printer on the same port via a pass-through connector. Moving either manufacturer's drive to a different computer is a simple matter of plugging the drive in and installing a driver. Liberty embeds a Trantor SCSI controller board in its drive, so when the Liberty is attached to your PC via its parallel port connector, you can attach other SCSI peripherals to the Liberty SCSI port. But because the drive is linked to the computer through a parallel port, performance is markedly slower than when connected to a computer-based SCSI adapter. Valitek's drive also embeds a Valitek SCSI controller and provides drivers that allow you to piggyback additional 3½-inch MO drives (no other SCSI devices are supported) to the printer pass-through port. Moving either manufacturer's drive to a different computer is a simple matter of plugging the drive in and installing a driver.

Getting It Together

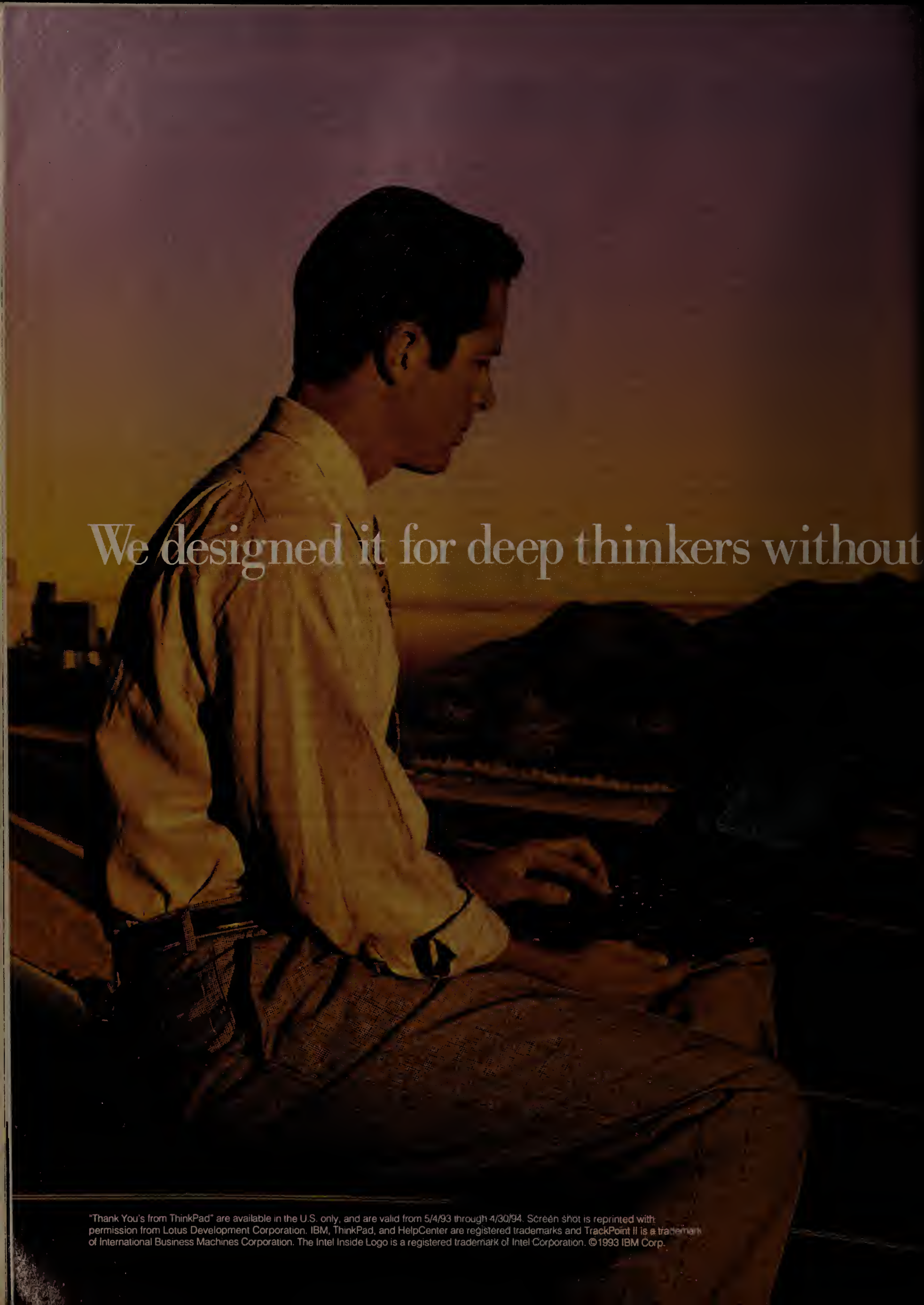
Installing an MO drive is one of the most involved upgrades you can undertake, and unless you've done it 20 or 30 times before, you'll need installation instructions that guide you through the entire process. About half the

MOs Save a Lot When You Store a Lot

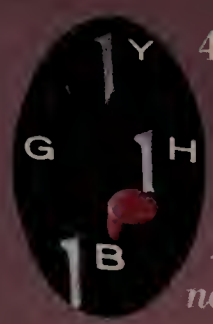
With prices starting around $1000, magneto-optical drives at first seem expensive compared with their removable-media competition—the Iomega Bernoulli and the SyQuest drives, which cost $450 to $800. In the chart below, we compare the cost per megabyte, based on advertised street prices, for using these drives at different capacities. We include the cost of using IDE hard drives as a reference point. Bernoulli and SyQuest cartridges are much more expensive ($70 to $150) than MO cartridges, so in the long run you'll spend less to store data if you use an MO drive. A tape drive is the cheapest removable-media storage device, but it's very slow.

Cost per megabyte

Type of media	STORAGE AMOUNT 120MB	200MB	500MB	1GB	2GB
128MB MO drive	$8.21	$5.18	$2.27	$1.34	$0.87
256MB MO drive	$15.83	$9.50	$3.90	$2.05	$1.12
90MB Iomega Bernoulli	$7.48	$5.23	$2.99	$2.39	$2.01
150MB Iomega Bernoulli	$7.90	$5.49	$2.79	$1.84	$1.44
44MB SyQuest drive	$4.92	$3.65	$2.44	$1.99	$1.80
88MB SyQuest drive	$7.08	$4.75	$2.50	$1.85	$1.48
120MB IDE hard drive	$2.08	$2.50			
200MB IDE hard drive	$2.92	$1.75	$2.10		
500MB IDE hard drive			$1.80	$1.80	
1GB SCSI hard drive				$1.55	$1.55



"Thank You's from ThinkPad" are available in the U.S. only, and are valid from 5/4/93 through 4/30/94. Screen shot is reprinted with permission from Lotus Development Corporation. IBM, ThinkPad, and HelpCenter are registered trademarks and TrackPoint II is a trademark of International Business Machines Corporation. The Intel Inside Logo is a registered trademark of Intel Corporation. ©1993 IBM Corp.



486SL fire. Blazing VGA graphics, color or mono. Very cool price. The ThinkPad® 350 series.

The TrackPoint II™ pointing device. Pressure sensitive. Press harder, go faster. More in tune with you than a mouse. A true extension of your finger. The very essence of *natural computing.*

PCMCIA Cards

Brilliant images. Brilliantly displayed. Big hard drives. Up to 250MB. For even bigger ideas. PCMCIA flexibility. Keys familiar to the touch. Big screens. Easy on the eyes. Computers designed from the person up. 5.2 lbs. of incredible substance. And style.

Human by design. It's not just about the size of the screen. The size of the keyboard. The size of the hard drive. It's also about the size of your budget. How does $1,999 fit in? Would you mind a booklet worth nearly $4,000 in savings on valuable mobile products and services? Didn't think you would. We call them "Thank You's from ThinkPad." You'll call them a great deal. You can also call us at the Personal Systems HelpCenter® to find out more—1 800 772-2227.*
To order, call 1 800 IBM-2YOU and refer to ZAB.**

intel inside

*In Canada, call 1 800 465-7999. **Available Monday–Friday, 8 a.m.–midnight EDT; Saturday, 8 a.m.–7 p.m. EDT. †Depending on usage and configuration. ††IBM price for ThinkPad 350 (monochrome) with 125MB Hard Drive. Prices and specs differ for other models. Dealer prices may vary.

deep pockets. ThinkPad 350

What's inside

Processor: 486SL 25 MHz	Faster than a shrinking budget.
Display: 9.5″ monochrome	Big picture without big bucks.
Weight: 5.2 lbs. (with battery pack)	Light on your wallet; light on you.
Battery Life: 2.6 to 9.3 hours†	Get ready for the longest power trip of your life.
PCMCIA: Type II (2.01) slot	Adapters the size of a credit card.
Hard Drive: 125MB or 250MB	Store all of your deepest thoughts.
Price: $1,999.00 for 125MB††	Who says power has its price?

Human by design.

Color and monochrome displays available.

IBM®

Circle 108 on reader service card

drives come with this kind of assistance—the rest suffer from glitches and gaps. I was able to install all the drives to my existing Adaptec controller without trouble, with the exception of the Liberty drive, which uses a 25-pin SCSI-1 connector. Liberty sells a 25-pin to 50-pin cable, but didn't include one with the review units.

In most cases, all I needed to do was partition the drive with Adaptec's AFDISK utility (much as you would use FDISK to partition your hard disk) then format with DOS's FORMAT command. In several cases the blank disks included with a drive came with a low-level format that AFDISK couldn't read, which meant I had to perform a low-level format with another Adaptec utility.

The technology behind magneto-optical drives also offers a benefit that magnetic drives and tape can't: durability. Optical disk manufacturers rate the shelf life of an MO disk conservatively at 30 years.

These glitches illustrate a big problem with MO drives—media interchangeability. All the drives reviewed conform to an industry standard for the physical format of 128MB 3½-inch optical disks, and thus, any one of them can low-level format, partition, and write to any disk. There is no standard for low-level formatting and partitioning, however, and whether a disk created on one drive can be read on another drive is a crapshoot. If you need to ensure media compatibility among a number of drives in your office or a client's, your best route is to standardize on a single controller/software combination or a universal SCSI formatting utility. Corel Corporation's CorelSCSI works with a long list of SCSI devices and controllers that conform to the Advanced SCSI Programming Interface (ASPI).

Next I installed every drive using the SCSI controller bundled by the manufacturer. The Ocean Vista 256 is a partial exception—the company includes disk partitioning and formatting software with its drive, but doesn't sell adapters. The Liberty drive includes a separate controller, which I tested along with the embedded SCSI controller/parallel interface. Finally, Valitek doesn't sell a SCSI adapter for its drive, so I installed it using the parallel interface only.

MO Installation Blues

Installing drives from FWB, IBM, Maximum, Pinnacle, PLI, and Relax was a snap. Installing the adapter and software bundled with the Liberty drive went smoothly except for one hitch: The adapter's built-in floppy controller arrived enabled, which means most users will need to disable it. Documentation didn't illuminate this important fact. Ocean's software installation program repeatedly tried to write to the A: drive, and tech support couldn't explain why.

Installing Procom's drive was more difficult. None of the included documentation explains how to install the necessary removable media drivers, a fact Procom says it will remedy. You might figure out that you need to run the INSTALL program; however, the MO driver won't work with DOS 6.0 until you use DOS's SETVER utility to fool it. Procom said it would post an updated driver on its BBS shortly.

Ricoh's bundled software and adapter were easy to set up, but after rebooting, Corel's ASPI driver issued a 'Sector size too large' error message and the system froze. Corel tech support said the install program doesn't work properly on DOS 6.0 systems where DoubleSpace disk compression is installed, then offered a fairly complicated workaround. Corel says an update is under way.

DOS 6.0 put the kibosh on Sony's disk-formatting and partitioning utility as well. Adapter and driver installation was a breeze, and the company's support staff was very helpful. But, you can't format and use a blank disk with this drive under DOS 6.0 until Sony's update is available.

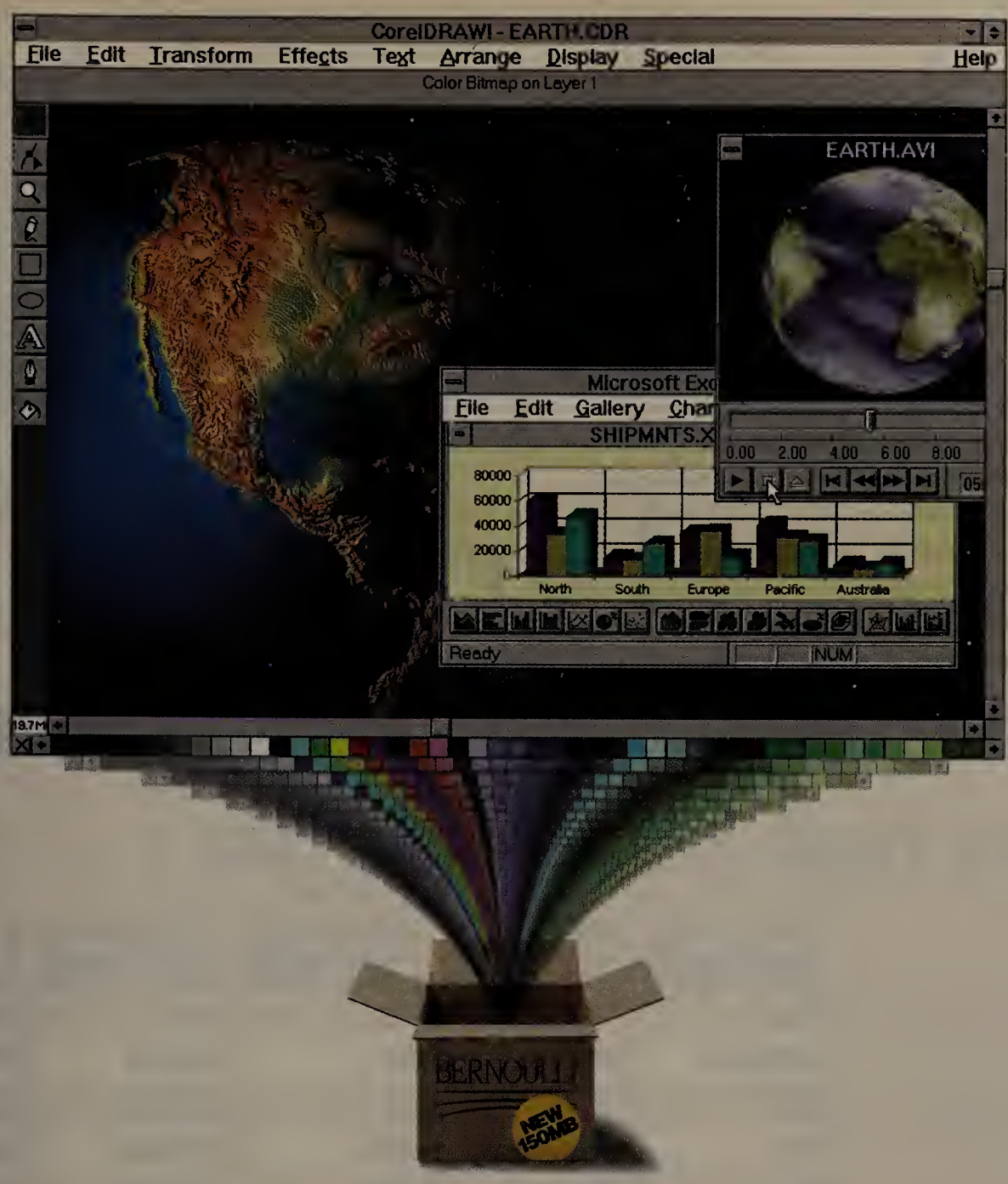
Valitek's software installation program is a study in minimalism. It pokes around your system, asks some questions, then displays the line you should add to CONFIG.SYS (you'll have to write it down carefully), and reminds you to copy the driver to your hard disk. The disk-partitioning and formatting program is not mentioned in either the Readme file or in printed documentation.

Focusing the Opticals

The PC World Test Center Report shows how each drive performed in three specific tasks: reading and writing raw contiguous data to and from the drive (using DOS COPY and XCOPY commands) and noncontiguous reading, which indicates how well a drive will perform under ordinary conditions (the test involves querying an indexed Paradox database). Formal testing showed otherwise, but in everyday tasks—running software, and opening and saving files—most drives performed about the same. The exceptions were the Liberty and Valitek units, which were perceptibly slower when installed to the computer's parallel port. The rest of the drives were just tolerable.

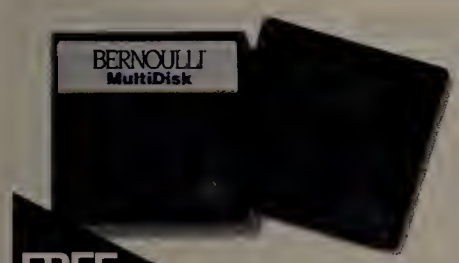
The Test Center found Pinnacle's drive to be the fastest overall, with blazing write performance thanks to the drive's whopping 4MB buffer. The drive came in dead last in the Paradox test, however. A Pinnacle spokesperson said that the drive is designed to perform well at tasks that MOs do best: capturing streams of multimedia data such as sound or video, or working on large bit-mapped images that are usually opened and read once at the start of an editing session, but saved many times throughout. Ocean's drive was nearly as fast as the Pinnacle, with more balanced performance, and turned in the top read speeds. Drives from FWB, PLI, Procom, Ricoh, and IBM also performed well.

It pays to shop around for good service and support. A one-year warranty is a sign that the manufacturer believes in the product—accept nothing less. A 30-day money-back guarantee is harder to come by, but can make the discovery that you really don't need an MO drive less painful. A quick turnaround policy limits costly downtime, and long support hours that extend into the weekend, a toll-free number, and the ability to get help via fax or BBS save you time and money.



Windows users are opening up a new world of possibilities.

The new Bernoulli® 150. Get increased performance with fast cache built in.



FREE Now, get a free 90 or 150MB disk when you buy the Bernoulli 90 or high-performance 150 Insider, Transportable or Dual drive.

Ah, the things you can do with software these days. Amazing, isn't it?

That's why we created the new Bernoulli 150 removable drive. So you can get more out of your storage than ever before—more freedom. More excitement. And frankly, more storage.

With the new Bernoulli, you'll get a free 150MB disk included with your drive. So you can explore new ideas without running out of space. Then just add inexpensive disks as you need them—in 150, 105, 90, 65 or 35MB sizes. That's what we call MultiDisk™, a feature you can only get with the Bernoulli 150.

What's more, you can take your data where you need it, when you need it. Free from worry.

And since no one has time to sit on their hands, we've included new 256KB fast cache firmware for even better performance.

As you might have guessed, only award-winning Bernoulli Drives give you this much potential.

Call 1-800-933-7679.

Or visit your local dealer. And from now on, expect the world out of your storage.

IOMEGA®
Makers of Bernoulli

©1993 Iomega Corp. The Iomega logo and Bernoulli are registered trademarks, and MultiDisk is a trademark of Iomega Corp. All other products are trademarks of their respective holders. For customer service in U.S.A. and Canada, call 1-800-456-5522. In Europe, call 49-761-45040. For worldwide customer service, call 1-801-778-3000. For accessory items, call IOMART at 1-800-723-3770.

Circle 152 on reader service card

Drive 'Em Home Today

None of the MO drives here is a lemon, but two desktop drives stand out: The Pinnacle PMO-130 and Ocean Vista 256. The PMO-130 offers excellent design and ease of use, fast performance in media-intensive applications, and one of the lowest prices. The Ocean Vista 256, though considerably more expensive than the cheapest drives, is also fast, well-designed, easy to use, and offers twice the capacity of most 3½-inch MO drives. Three other drives are worthy runners-up: Relax's is a bargain, but ran about 25 percent slower than the fastest drives. IBM's is almost as slow and more expensive, but comes with hassle-free installation and great support. The PLI drive's price lies between IBM's and Relax's, and installation is painless. If portability is a must, Liberty's 70MO is about as fast as Relax's and IBM's when connected to your computer's SCSI adapter, occupies almost no desk space, and connects to any PC with a parallel port in minutes.

With their high capacity, portability, and practically unflappable data integrity, MO drives may provide the solution to your storage overload. At press time, manufacturers including Pinnacle, Maximum Storage, and Sony, had slashed list prices. According to Stan Corker, director of removable storage research at International Data Corporation, street prices may drop to $700 by year's end. If discounting continues, MO drives may increase in popularity as a mass-storage solution. Then, instead of deciding what to delete in order to install your 30MB spelling checker, you'll fish through your pockets thinking, "Now where did I put that disk?"

Scott Spanbauer is a contributing editor for PC World. *Research assistance was provided by John Goddard and Anita Hamilton.*

For more information about all products in this article, circle reader service no. 907.

PC WORLD TEST CENTER REPORT

MO Drives: Pinnacle and Ocean Top the Charts

	COPY 15MB HD to MO	Paradox lookup	COPY 15MB MO to HD	XCOPY 100MB HD to MO	XCOPY 100MB MO to HD
Pinnacle Micro PMO-130*	[illegible]	19:26	[illegible]	14:11	[illegible]
Ocean Vista 256*	[illegible]	4:51	1:27	27:30	9:55
FWB HammerDisk 130	[illegible]	7:39	1:35	[illegible]	10:54
PLI Infinity Optical 3.5"	[illegible]	8:54	2:23	33:54	[illegible]
Procom MEOD 128	[illegible]	8:50	[illegible]	34:20	[illegible]
Ricoh Transporter PC/e	[illegible]	8:04	[illegible]	[illegible]	11:29
IBM 3.5" Enhanced Rewritable MO	[illegible]	7:39	1:32	[illegible]	10:58
Valitek PST-MO128	[illegible]	7:36	1:34	[illegible]	10:36
Liberty 70MO	[illegible]	8:24	[illegible]	[illegible]	11:33
Relax Sierra 128	[illegible]	8:18	[illegible]	[illegible]	11:43
Sony RMO-S350	[illegible]	10:07	[illegible]	[illegible]	[illegible]
Maximum Cachet System 6	[illegible]	9:31	2:53	24:24	[illegible]
Liberty 70MO[1]	[illegible]	12:12	[illegible]	[illegible]	[illegible]
Valitek PST-MO128[1]	[illegible]	14:55	[illegible]	[illegible]	[illegible]

*Best Buy

[1] Tested with parallel adapter.

Drives are arranged in order of overall speed, from fastest to slowest. All test results in minutes:seconds.

Methodology We used each vendor's software utility to partition and prepare the MO disk provided, using the maximum available space. We chose not to make the partitions bootable because our test assumes a hard disk is booting the machine. The Windows 3.1 documentation states that if you have a SCSI hard disk, you may need to use the double-buffering feature of SmartDrive, so we activated double-buffering for all of the SCSI drives unless the manufacturer specifically said not to. Here are the steps we followed to test each MO drive: We installed the MO adapter shipped with the product, using all default settings recommended by the manufacturer. We initialized the MO cartridge, following the vendor's recommendation for setting up the cartridge. We partitioned the disk as one non-bootable DOS partition. We used Norton SpeedDisk to defragment the hard disk. We fragmented the hard disk using a fragmentation utility so the hard disk was in the same fragmented state prior to performing the first copy on each MO drive. 10MB of disk space was fragmented.

COPY 15MB, HD to MO We time how long it takes to do a DOS COPY of a 15MB Paradox database file from hard disk to MO drive and then flush SmartDrive's cache.

Paradox lookup Running Paradox for DOS on the hard disk, we perform a query that pairs sales orders with their line items according to 16-byte indexed order number. The query matches 2111 records. All data files and index files reside on the MO.

COPY 15MB, MO to HD We time how long it takes to do the previous COPY from the MO drive to the hard disk and flush SmartDrive's cache.

XCOPY 100MB, HD to MO We time how long it takes to do a DOS XCOPY of all files and subdirectories (118.5MB in 2800 user files) on the hard disk to the MO drive and then flush SmartDrive's cache.

XCOPY 100MB, MO to HD We time how long it takes to do the previous XCOPY from the MO drive to the hard disk and flush SmartDrive's cache.

Data based on tests designed and conducted by the PC World Test Center. Testing performed by Senior Performance Analyst Tom Grubb. All rights reserved.

Our print systems have the extras built in.

The QMS® 420 and the QMS-PS® 410 Print Systems make options unnecessary! Both printers easily accommodate DOS/Windows,™ Macintosh® and Unix® systems while supporting your Windows and other applications by automatically selecting the correct printer language from those available (ESP). They simultaneously receive data on serial, parallel and LocalTalk™ ports for greater efficiency (SIO) and can print PostScript™ language, HP PCL® and HP-GL® documents.

The QMS 420 Print System. At $1,995, it's your best value in high resolution printing.
It features 600x600 dpi printing and is compatible with PostScript Level 2 and Level 1, HP PCL and HP-GL print languages. With its 39 fonts for PostScript language printing, resident HP PCL compatible fonts, the efficiency of SIO and the convenience of ESP, it sets new standards of satisfaction for individual users and small workgroups.

The QMS-PS 410 Printer. At $1,595, it's the value leader in 300 dpi printing.
It features Adobe's PostScript Level 1 and compatibility with HP PCL (HP-GL is optionally available). It has 45 standard fonts for PostScript language printing, HP PCL compatible fonts, and the efficiency and convenience of EPS and SIO.

QMS®

Call 800 972-6695 or 205 633-4300 for more information about the QMS 420 and QMS-PS 410.

QMS, QMS-PS and the QMS logo are trademarks or registered trademarks of QMS, Inc. PostScript is a trademark of Adobe Systems Incorporated which may be registered in certain jurisdictions. All other products and company names mentioned are trademarks or registered trademarks of their respective companies.

Circle 202 on reader service card

FEATURES COMPARISON

MO Drives: Capacity and Reliability in a Portable Form

● Yes
○ No

	FWB HammerDisk 130	IBM 3.5" Enhanced Rewritable Magneto Optical Drive	Liberty 70MO	Maximum Storage Cachet System 6	BEST BUY Ocean Microsystems Vista 256	BEST BUY Pinnacle Micro PMO-130	PLI Infinity Optical 3.5"	Procom MEOD 128	Relax Technology Sierra 128	Ricoh Transporter PC/e	Sony Electronics RMO-S350	Valitek PST-MO128
Standard features												
Selling price as of 4/15/93[1]	$1999	$2047[2]	$1499[2,3]	$985[2]	$1798[2]	$1164[4]	$1599	$1817	$999[2]	$1750	$1943	$1795
Interface type	SCSI	SCSI	SCSI/[5] parallel	SCSI	SCSI	SCSI	SCSI	SCSI	SCSI	SCSI	SCSI	SCSI/parallel/serial
Includes a cartridge	●	●	●	●	●	○	●	●	●	●	●	●
Unformatted capacity	128MB	128MB	128MB	128MB	256MB	128MB	128MB	128MB	128MB	128MB	128MB	128MB
Partition disk with boot sector	●	○	●	●	●	●	●	●	●	○	●	●[6]
Manufacturer's specifications												
Drive mechanism manufacturer and model name	Panasonic LF-3000	IBM Adstar MD 3125B	Ricoh Transporter	Sony SMO-P301	MOST RMD 5200-S	Pinnacle OHD-130	Sony SMO-P301	Sony SMO-P301	Ricoh Transporter	Ricoh Transporter	Sony SMO-P301	Panasonic LF-3000
Average seek	45ms	40ms	42ms	40ms	35ms	19ms[7]	40ms	40ms	33ms	<45ms	<40ms	40ms
Average latency	9.9ms	10ms	10ms	10ms	12.5ms	9ms	10ms	10.4ms	10ms	10ms	10ms	10ms
Mean time between failures (hours)	25,000	40,000	25,000	25,000	30,000	30,000	25,000	25,000	30,000	25,000	40,000	30,000
Disk rotation speed (RPM)	3600	3000	3000	3000	2400	3000	3000	3000	3000	3000	3000	3000
Buffer size	128K	256K	64K	64K	128K	4MB	64K	64K	128K	256K	64K	128K
Design and construction												
Unit tested	external	external	portable	external	external	external	external	external	external	external	external	portable
Other configuration available	internal	internal	none	internal	internal	none	internal	none	internal	internal	internal	none
Power supply	internal	internal	internal	internal	internal	internal	internal	internal	external	internal	internal	internal
Height by width by length	2.25 x 9.75 x 9.75	3.25 x 9.5 x 11	5.37 x 2 x 7.75	4.25 x 5.12 x 9.25	2.5 x 9.75 x 10.5	3 x 7 x 8.25	2.5 x 9.75 x 9.75	2.37 x 9.62 x 10.5	5.62 x 2.25 x 8.5	6.12 x 3.75 x 9.5	3.12 x 9.87 x 11.25	4.5 x 6.0 x 14.5
Mount (horizontal, vertical, or both)	horizontal	horizontal	vertical	horizontal	both	both	both	both	vertical	vertical	both	horizontal
Power-on indicator	●	●	●	●	●	●	○	○	●	●	●	●
Emergency eject	●	●	●	●	●	●	●	●	●	●	●	●
Front-panel power switch	○	●	○	○	○	○	○	○	○	●	○	○
Compatibility												
Works with Macintosh	●	○	●	●	●	●	●	●	●	○	●	●
Micro Channel bus interface	●	●	●	○	○	●	●	●	●	○	●	●[8]
Service and support												
Warranty (months)	12	12	12	3	12	12	12	12	12	12	12	12
On-site service price per year	○	free	○	○	○	○	○	○	○	○	varies[9]	○
30-day money-back guarantee	○	●	●	○	●	●	●	○	●	○	●	●
Turnaround policy (days at service center)	2	1	2	7 or more	3	2	2	2	2	10	7 to 10	1
Toll-free support number	○	●	○	●	●	●	●	●	○	○	●	●
Daily support (hours)	10	12	9	9	9	10	9	10	9	8	9	10
BBS/fax support	○/●	○/●	○/●	○/●	○/●	●/●	●/●	●/●	○/●	○/●	●/●	●/●
Telephone number	415/ 474-8055	800/ 772-2227	408/ 983-1127	800/ 843-6299 719/ 531-6888	800/ 944-6232 714/ 898-1340	800/ 553-7070 714/ 727-3300	800/ 288-8754 510/ 657-2211	800/ 800-8600 714/ 852-1000	510/ 471-6112	800/ 955-3453 408/ 432-8800	800/ 352-7669	800/ 825-4835 413/ 549-2700
Reader service no.	600		602	603	604	605	606	607	608	609	610	611

[1] Selling price is either direct or the average price found in calls made to multiple dealers. Includes external drive, adapter (if required), cables, and the cost of an optical cartridge, if not included with drive.

[2] Direct price.

[3] SCSI adapter not included.

[4] Vendor-estimated street price.

[5] 8- and 16-bit SCSI controllers extra-cost option.

[6] With SCSI controller.

[7] Vendor-estimated "effective seek" time.

[8] Via parallel-to-SCSI interface.

[9] Price ranges between $150 and $525 depending on seventy of problem supported.

Lightest, Full-Featured Subnotebook Ever!

Sparkling bright sidelit VGA display with 64 shades of gray

Keyboard controls for precise digital brightness and contrast adjustments

Type II PCMCIA slot for LAN adapters, modems and other devices

LCD display gives you instant battery and hard drive status

Integrated trackball mouse with ergonomic three-button design

Removable 80MB hard drive

Slim and trim design measures 7″ x 10″ x 1.5″; weighs just 3.9 lbs.

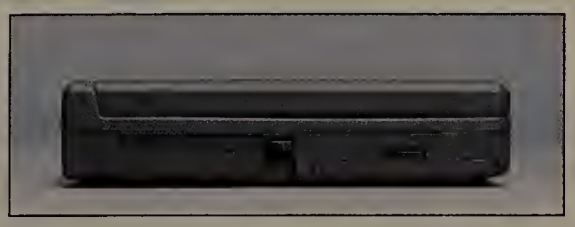
Presenting The Northgate® ZXP-XL At An Incredibly Low $1799!

A masterpiece of engineering!
Northgate widens the lead in portable computing with ZXP-XL. It gives you the full 486/33 SLC power you need...in a "go anywhere" case that's smaller than a sheet of paper and weighs less than 4 pounds! But don't be deceived...ZXP-XL is big on features!

You get 4MB of RAM (expandable to 8MB), a 9600/2400 baud internal fax/modem, external 3.5″ floppy drive, DOS 6.0, Windows 3.1, AC adapter/charger and more.

Powering this wonder is a nickel metal hydride battery that provides up to five hours of power with power management enabled. Of course, ZXP-XL comes backed by Northgate's 1-year warranty, 30-day moneyback trial and fabulous 24-hour tech support. See it for yourself...call in your order now!

On the back of ZXP-XL you'll find a VGA monitor port, PS/2-mouse/keyboard, floppy disk drive, serial port, parallel port, and fax/modem jack.



Left side features PCMCIA socket and a powerful, lightweight NiMH battery for hours of use on the road or in the air.

Call To Place Your Order Now!
800-874-5767

GSA #GS00K91AGS5193 PS01

Major credit cards, money orders, direct wire and approved company purchase orders accepted.

MICROSOFT WINDOWS READY-TO-RUN

NORTHGATE
7075 Flying Cloud Drive, Eden Prairie, MN 55344

© Copyright Northgate Computer Systems, Inc. 1993 All rights reserved Northgate, ZXP and the Northgate logo are trademarks of Northgate Computer Systems. Prices and specifications subject to change without notice Prices shown are U.S. dollars and do not include shipping and handling charges or appropriate sales taxes. Northgate reserves the right to substitute components of equal or greater quality or performance All items subject to availability and offer is valid in the U S and Canada only

Catch a r

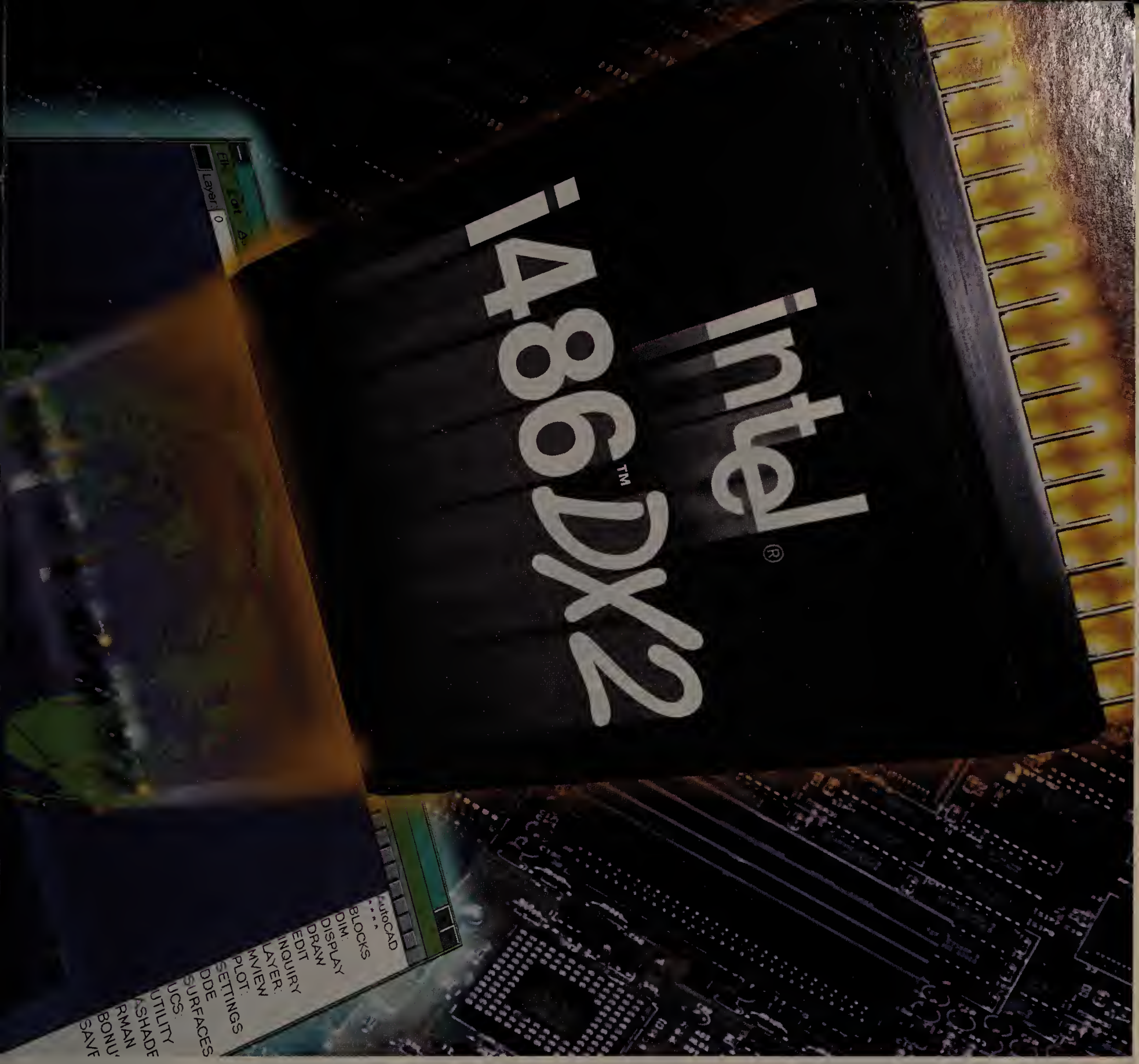
The Intel486™ DX2 processor.

With its unique speed-doubling technology, the i486™ DX2 processor delivers twice the performance of our i486 DX processor at a comparable system price.

This means you get the performance you need for today's most popular applications. With performance to spare for demanding applications like video, using Intel's Indeo™ video technology, and new applications just around the corner.

And like all Intel486 processors, it's designed for

© 1993 Intel Corporation.



ising star.

future upgradability with an Intel OverDrive™ Processor so your PC can grow as your needs grow.

Performance, compatibility and room for the future—three reasons the i486 DX2 processor is today's best value.

So catch a rising star. And watch your software performance reach new heights. To learn more about our i486 DX2 processor, call 1-800-395-7009 and ask for extension 14. Or see your local computer reseller.

intel®

Circle 106 on reader service card

23.34

Instant Payback Software

Want to see a quick boost in your bottom line? These 22 programs–from billing to mailing to personal finance–promise to transform your PC into an instant cash machine.

You buy a new software package and open the box. At the top is a crisp $100 bill. Or a blank check with your name on it.

Impossible? Not really. Knowing that software takes a big bite out of your budget, we set out to find programs that provide *instant payback*, allowing you to recoup their cost immediately. We scoured the PC universe for these packages, talking with dozens of large and small businesses and monitoring scores of electronic bulletin boards. We haven't quite found a program that prints $1 bills, but we've come awfully close. These

By Steve Bass

MICHAEL BARTALOS

22 programs save enough cash—not just productivity or time, but actual hard cash—to quickly pay for themselves and even bring in extra dough. Many provide innovative ways to automate your business that you may not have realized were possible.

We've listed this software in eight categories of common business tasks: billing, check writing, financial decision making, graphic design, legal matters, mailing, payroll, and shipping. The products we've selected can help your business in many ways, from automating a department to improving personal productivity. Among the 22 programs are inexpensive shareware packages and even some free software. Look them over; your bottom line will be glad you did.

Billing

Timeslips 5

You discuss a problem with a client, do some related research, and make phone calls, squeezing the work in between meetings. When you're ready to generate the client's bill, it's difficult to capture every billable minute. Why not simplify the process and make it more accurate with Timeslips 5? The program efficiently tracks your hours and outputs detailed bills. A pop-up stopwatch enables you to record every minute (or even seconds for attorneys). You can track thousands of clients, have six billing rates, and use up to 15 user-definable fields to store in-depth information about clients. Timeslips' report generator produces custom reports, bills, graphs, and data analysis, to name just a few. For another $79.95, Timeslips' Accounting Link will provide a seamless link to many major accounting packages. List price: $299.95. Timeslips Corp., 800/285-0999, 508/768-6100, 508/768-7660 (fax).

Reader service no. 615

TimeTrac 93a

✔SHAREWARE If you don't require a program that generates bills, TimeTrac is a cheaper alternative. In addition to keeping time, the program allows LAN and remote users to integrate their time records—useful when a group is working on a single client's project. TimeTrac's multiple interruption handling allows you to switch from project to project while keeping track of them all. And because TimeTrac is small—only 355K—it's easy to bring with you on a notebook. You can also export TimeTrac's data to a word processor to create your own bills. TimeTrac is available as TT92A.ZIP on PC World Online and other online services. Registration fee: $50. Compass/New England, 603/431-8030.

Reader service no. 616

Check Writing

Disbursements Manager 1.20 (Windows), Cheqwriter 1.10 (DOS)

WINDOWS One of the best-kept secrets in the banking

Stamps

Can't remember how many stamps to put on a letter that weighs 3 ounces? Every time you slap on an extra one, you lose money. Instead, buy a letter scale, which costs between $5 and $10 at any office supplies store, and then load up Stamps, a free utility that figures out the right postage. Type STAMPS followed by the weight, and the postage amount pops up on screen. You can find Stamps as STAMPS.ZIP on PC World Online and other on-line services. Free.

Reader service no. 635

Save Money at the Post Office

Doing mailings right can save you lots of money. Putting ZIP+4 on your labels gets the envelope to its destination faster. Adding a bar code often cuts the delivery time in half. If you can correct ZIPs and addresses before you mail—and eliminate returns—you've saved postage, paper, envelopes, and labor. To dig into the *big* savings, get a $75 First Class Presort mail permit from the post office. With the yearly permit your 1-ounce, first-class unsorted mail *with* ZIP+4—you'll need at least 250 pieces—costs you 27.6 cents per letter instead of 29 cents. Sort at least 500 envelopes for the post office and the price drops to 24.2 cents per envelope. Stick on an 11-digit bar code and you pay only 23.3 cents. Mail 2000 pieces and you save $114. Do that a few times a year and, well, you get the idea (see "Cut the Cost of Mailing"). Many of the software packages we've listed take care of the tedious job of presorting and printing the special forms the post office requires. Just about the only thing these programs leave out is the rubber bands.

There's one more catch. The ZIP codes on your mailing list must adhere to the Postal Service CASS-standard—Coding Accuracy Support System. If fewer than 85 percent of your letters are correct you don't get the discount. You can submit your mailing list on disk to the post office and they'll process it for you once at no charge (National Customer Support Center, 800/238-3150). You do have to recertify your list yearly. But you can do it in your office for free with CASS-approved software. Or, for about $4 per 1000 names, you can have it certified by an outside firm. Most of the time the post office's business center will provide you with a vendor list.

The post office is eager to help. Locally, you can call your post office's business center. The folks there will walk you through the permit process. The post office's marketing department will send you a free Mail Flow Planning System program, which lets you use your computer to get an overview of the mailing process. It provides a wealth of tips to get your mailings delivered quickly. You'll find the program as USPSMF.ZIP on PC World Online

industry is that you don't have to pay for preprinted checks. Just print them yourself on a laser printer using blank safety check paper and stop paying your bank check-printing fees (see "Printing Your Own Money"). These products take care of everything—check number, bank encoding, logos, and even signatures. The only thing they won't do is make sure you have enough money in your account. They also print financial documents that need magnetic ink character recognition coding, such as deposit slips and preauthorized drafts. The programs accept data from Quicken, QuickBooks, Accpac, and other accounting programs. List price: $59 to $479 depending on the accounting program. Cheqsys, 617/621-7194.

Reader service no. 617

LaserMax

✔SHAREWARE If you want to try printing your own checks, have a look at LaserMax, a $49 shareware program. LaserMax supports Quicken for DOS and Windows, QuickBooks, QuickPay, Pacioli, Microsoft Money, and Managing Your Money and prints to any Hewlett-Packard LaserJet or compatible printer. It's available as LB121.ZIP, LQ121.ZIP, and LQW121.ZIP on PC World Online and other online services. Registration fee: $49. LaserMax Software, 800/385-2737, 518/523-2712, 518/523-8920 (fax/voice).

Reader service no. 618

Financial Decision Making

Fixed Asset Pro 1.2

✔SHAREWARE Tracking a small business's equipment and figuring out a depreciation schedule is a nasty chore. You can pay an accountant to do it or save the money by using Fixed Asset Pro. The program guides you through the process, asking questions about each item and providing comprehensive help. You can choose from five sets of "books" that use the rules from depreciation methods such as alternative minimum tax, federal tax, financial, and state. Fixed Asset allows for fiscal years that differ from the calendar year, applies tax limits, does projections and comparisons, and determines automobile depreciation limits. When the tax code changes, HammerSoft sends updates. The file is available as FAPRO12.ZIP on PC World Online and other online services. Registration fee: $79.95. HammerSoft, 419/986-6007.

Reader service no. 619

Hamlet 2.7

To lease or not to lease, that is the question. A wrong decision can be expensive. Hamlet makes the choice relatively painless and can pay for itself quickly if you're dealing with large amounts of money. Hamlet uses the net present value method, letting you compare purchase and lease alternatives to determine which option is the least expensive. You enter optional variables such as debt, lease, tax, and equipment into Hamlet and make a decision based on which of the outcomes looks most attractive. You can also perform a break-even analysis, examine the added cost of delayed equipment payments, and factor in one of seven depreciation methods. Hamlet lets you generate summary and detailed reports, such as debt amortization schedules and tax reports, and can export them to the DIF format for use in your favorite spreadsheet. List price: $695. Decision Systems Inc., 612/338-2585, 612/337-5967 (fax).

Reader service no. 620

Per%Sense 2.0

Is it better to refinance your loan or pay it off? Pay a year's rent in advance and take the discount or put the whole amount in a CD and collect the interest? Ask Per%Sense, an inexpensive financial calculator that will help you make the best choice for your bottom line. Per%Sense talks you through the situation, requesting data as you go, or lets you plug your numbers into one of

Shareware at Your Service

Like instant gratification? Can you do without fancy packaging and shrink-wrap? Then shareware is the way to go, especially since it can save you a bundle.

For instant access to the shareware mentioned in this article, we've listed the more popular online services and BBS's across the country. You can access them with a 1200- or 2400-bps modem. All the shareware and free programs are available on PC World Online. You can also get the packages through the distributors listed at right.

ONLINE SERVICES AND BBS'S

America Online
800/827-6364 (membership), 703/448-8700

Channel 1
617/354-8873 (BBS)

CompuServe
800/848-8199

Exec-PC
414/789-4210 (BBS)

Executive Network
914/667-4567 (BBS)

HH Info-Net
203/738-0342 (BBS)

PC World Online
PC World Online is a part of America Online (800/827-6364) and CompuServe (800/848-8990)

SHAREWARE DISTRIBUTORS

EMS
301/924-3594, 301/963-2708 (fax)

Public Brand Software (PBS)
800/426-3475, 317/856-4144

Public Software Library (PsL)
800/242-4775

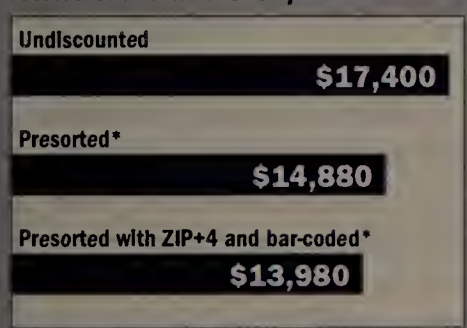
Software Excitement
800/444-5457, 317/286-3182 (fax)

and other online services or call 800/238-3150 to have a free copy mailed to you.

Remember, when you buy a mailing or UPS program, it's essential to register it with the vendor. When UPS or USPS rates increase, you'll want your software updated right away.

Cut the Cost of Mailing

The cost of mailing 5000 1-ounce letters over a 12-month period



**Presorted amounts do not include the Postal Service's $75 presort mail permit fee*

30 templates. List price: $49.95. Ones & Zeroes Software 800/882-2764, 415/587-1010, 415/334-8720 (fax).

Reader service no. 621

Graphic Design

Instant Artist

WINDOWS At one time or another, everyone needs business cards, even if it's just to impress an in-law. Save the cost of a designer and printer by doing it yourself with Instant Artist (see **FIGURE 1**). Choose from more than 35 professionally designed layouts. Business cards are printed ten to a page to fit perforated business card paper. Instant Artist also lets you design letterhead, banners, certificates, envelopes, and greeting cards. The program supports a range of dot matrix, ink jet, laser, PostScript, and color printers. List price: $79.95 for DOS; $89.95 for Windows. Autodesk Retail Products, 800/228-3601, 206/487-2233, 206/483-6969 (fax).

Reader service no. 622

FIGURE 1: INSTANT ARTIST SAVES YOU money with templates that allow you to design your own business cards or other publications.

Rockford 3.0

WINDOWS SHAREWARE If the only thing you want to print is business cards, do it with bargain-basement–priced Rockford. Its format options include vertical and horizontal placement, four border types; line, box, and circle drawing; and PCX and BMP clip art support. Rockford can use ready-to-cut or perforated card stock, or produce camera-ready art for your print shop. It's available as ROCKFORD.ZIP on PC World Online and other online services. Registration fee: $20. OsoSoft, 805/528-3753 (BBS).

Reader service no. 623

Legal Matters

AgreeMentor 2.3

Who was it that said, "Anytime I don't have to hire an attorney, I've saved money?" Probably me. If *you* hate to pay legal fees, consider AgreeMentor, a collection of templates for agreement forms such as Business Assets Transfer, Promissory Note, Authorization to Represent, Custom Development, Warranty, Referral Fee, and the ever-important Partnership Dissolution. The sound legal documents created by AgreeMentor use understandable English, not legalese. Just load the templates into a supported word processor—Ami Pro, Microsoft Works, Word for Windows, WordPerfect, and WordStar, among others—and fill in the blanks. List price: $99. Jian, 800/346-5426, 415/941-9191, 415/941-9272 (fax).

Reader service no. 624

Nolo's Partnership Maker

If you're starting a business partnership, think for a minute. Is a handshake enough? What happens when you disagree? You can save a bundle in legal fees—and avoid having your ex-partner sue you—with Nolo's Partnership Maker. Work your way through the program's clauses, selecting those that apply to your situation. Online legal help explains each clause and clarifies what you put into the fill-in blanks. Partnership Maker comes with a built-in editor or you can export the agreement to an ASCII file and use your word processor to format and print. List price: $129.95. Nolo Press, 800/992-6656, 510/549-1976, 510/548-5902 (fax).

Reader service no. 625

Small Business Advisor 93.3

SHAREWARE If you own a small business, you need to comply with zillions of state and federal regulations to avoid paying tax penalties. The Small Business Advisor acts as an interactive expert, supplying comprehensive legal, regulatory, and tax advice for small businesses in all 50 states and Washington, D.C. The first time you avoid a hefty penalty, you'll recoup the registration fee. It offers advice on a variety of issues, including home office deductions, incorporation, OSHA regulations, the Americans With Disabilities Act, environmental laws, and others. Updates are offered every three months. The file is available as SBADV63A.ZIP and SBADV63B.ZIP on PC World Online and other online services. Registration fee: $29.95. Ronin Software, 206/391-9521.

Reader service no. 626

Mailing

AccuMail

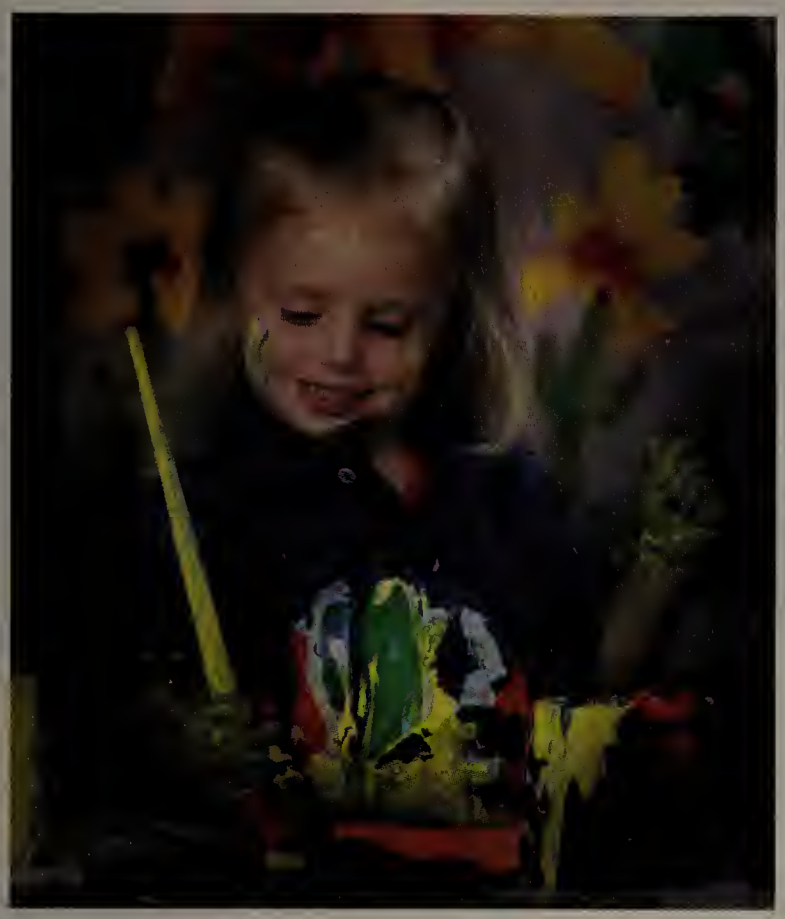
According to the U.S. Postal Service, 15 to 30 percent of average mass mailings are undeliverable due to faulty addressing. AccuMail compares your mailing list with the Postal Service's nationwide database—a 3.8GB compressed file—and corrects street and city names, states, and ZIP codes. Then it adds ZIP+4 (the last four digits of the nine-digit ZIP code), along with the new delivery point codes (the last two digits of the street address) to your database. If you do high volume or very localized mailings, let AccuMail add carrier route cod-

WonderBar

A bar code on each mailing label increases the likelihood your mail will get to its destination quickly—and it can also save you money. With WonderBar, applying bar codes is a snap. Insert the ZIP code preceded by a "^" where you want the bar code to appear. If the ZIP code is 91001-3539, just type ^91001-3539. WonderBar will print bar codes from 5 to 50 digits using laser, 24- and 9-pin dot matrix, and DeskJet ink jet printers. WonderBar is available as WUNBAR.ZIP on PC World Online and other online services. Registration fee: Free for private use by individuals, $35 for commercial firms and government agencies. Binary Systems, CIS: 72775,240.

Reader service no. 636

June 14, 1963.
Cindy Smith plays with color.



Thirty years later her business depends on it.

Introducing the QMS ColorScript Laser 1000. Now your business has total freedom of expression.

For Cindy, communicating decision-critical information quickly, flawlessly and in brilliant color is now her livelihood. That's why she depends on the QMS ColorScript® Laser 1000 Print System. It frees her to print entire forms and letterhead with color logos, images and high quality text without changing paper. It saves her the cost of stocking special forms, letterhead and multiple sets of supplies and uses standard paper and transparencies. It improves her message by highlighting key data with color in multipage presentations and documents. Add direct connection to a variety of networks and anyone can realize both greater productivity and a per user cost that rivals personal printers. Plus, our easy software loadable upgrades virtually eliminate obsolescence.

Save money. Save time. Free yourself from limitations. Discover the advantages of the QMS® ColorScript Laser 1000 Print System.

- Laser color and monochrome printing • Compatibility with PostScript™ Level 2 and Level 1, HP PCL®5C and HP-GL® • TrueType font scaling
- Automatic collation • All four ports accept data simultaneously
- Automatically interprets incoming data and selects correct language from those available • 65 resident type fonts, all with multilingual character sets
- EfiColor™ and Colorimetric color dictionaries and Apple ColorSync™ device profile • Supports DOS, Windows,™ Macintosh® and Unix® applications
- Software loadable system upgrades • QMS Crown™ multitasking technology.

Expression is a serious business.
Call QMS today at 800 972-6695 or 205 633-4300.

QMS

QMS, QMS ColorScript and the QMS logo are trademarks or registered trademarks of QMS, Inc. PostScript is a trademark of Adobe Systems Incorporated which may be registered in certain jurisdictions. All other product and company names mentioned are trademarks or registered trademarks of their respective companies.

Circle 184 on reader service card

ing to your list for even larger postage discounts. AccuMail is CASS-approved (see "Save Money at the Post Office"). The program supports mailing lists in most file formats including ASCII fixed field, Xbase, R:BASE, Q & A, and Paradox. You need a CD ROM drive to run AccuMail, but if you mail 5000 letters a month, you'll gain back the cost of both the program and the CD within six months. List price: $295 per quarter. Group 1 Software, 800/368-5806, 301/731-2300, 301/306-4373 (fax).

Reader service no. 627

DAZ-zle

WINDOWS Even if your mailing list is so small that you keep it in a Windows word processor, you can still save money on postage by making sure the address and nine-digit zip codes are correct. Just highlight the address you want on an envelope and copy it to the Clipboard. DAZ-zle grabs it from the Clipboard, dials the post office, verifies the address *and* adds the nine-digit ZIP code, pops the address onto an on-screen envelope, and sends it off to the printer. You think that's slick? DAZ-zle also computes the postage due and prints it on the envelope, so you don't waste money by adding too much postage. This version can process only one address at a time, but an address list version should be available when you read this. List price: $39.95. Envelope Manager Software, 800/576-3279, 415/321-2640, 415/321-0356 (fax).

Reader service no. 628

PostSave III

If you send mass mailings regularly but your company is too small to warrant a mail-room staff, you can save money by doing some work for the post office. Start by presorting first- and third-class mail. Earn a few more bucks by adding bar coding to your labels and sorting by carrier route. Sound tedious? PostSave can help (see "Save Money at the Post Office").

PostSave examines your mailing list, determines the lowest postage rate, and then sorts and qualifies the mail into appropriate categories. It also fills out the required postal forms. But that's just scratching the surface: PostSave tackles noxious mailing chores such as locating duplicates, the bane of every mailing list. The program also lets you split fields (to separate first and last name), change the case, replace field values, and mail-merge letters. It accepts Xbase, ASCII, comma-delimited, and fixed field files, supports numerous printers including dot matrix and lasers, and is network ready. List price: $499. Accurate Software, 800/732-3290, 415/591-5601, 415/594-8428 (fax).

Reader service no. 629

SoftSpoken Mailer for Windows 1.2

WINDOWS It used to be that DOS users banked the most lire in postage savings. But now small businesses using Windows can cash in with SoftSpoken's Mailer for Windows, a neat program designed to manage mailing lists. Mailer for Windows adds bar coding to your labels, presorts first- and third-class mailing lists automatically, and prints all the necessary mailing statement forms for the post office. It also finds and eliminates wasteful—and costly—identical and near-duplicate records. Mailer produces a disk with your list in a format approved by the post office. It imports from and exports to existing databases in Xbase, ASCII, and DIF formats. And it mail merges directly to WordPerfect and Microsoft Word for Windows. List price: $295. SoftSpoken, 800/536-1674, 919/870-5696 (fax).

Reader service no. 630

Payroll

QuickPay 2.0

WINDOWS If you use Quicken and pay an outside service to do your payroll, save yourself some bucks with QuickPay. This payroll add-in to Quicken prompts you to fill in data about employees and

Printing Your Own Money

If your business is at all automated, you probably print checks on a laser printer using preprinted check forms. But if you write many checks, have several checking accounts, or write checks for a number of different clients, you can save money by printing them on blank paper instead. You need a special MICR (magnetic ink character recognition) toner cartridge, available from Hewlett-Packard (800/538-8787), Troy (800/332-6427), Advantage Laser Products (800/722-2804), CheckMaster (800/334-8449), CHEQsys (617/621-7194), and others. The cartridge uses magnetic ink to print checks that your bank can read with optical character recognition (OCR) devices. Most people use the cartridge for check writing only, replacing it with their regular toner unit when the job's done. The cartridge lists for about $150, but remanufactured ones list for about $70.

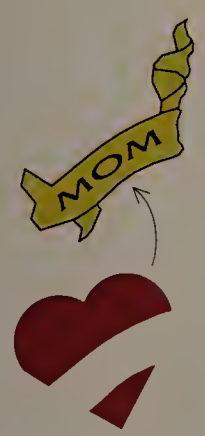
Using plain paper isn't a good idea—the minimum recommended weight is 24-pound stock—because it'll probably get jammed in the bank's high-speed OCR machinery. Your best bet? Buy blank laser safety check paper (with the endorsement portion on the back) from a company such as Forms Unlimited, 800/247-3676, 407/391-6900, 407/391-7344 (fax); or Duplex Products, 800/441-3571, 708/692-2260, 708/692-4423 (fax). You get about 2000 sheets for between $30 and $100. Remember, many people forgo the voucher portion of the check and print more than one check to a sheet, bringing down the cost to as low as $26 per 1000.

By comparison, a company such as NEBS (800/225-9550) sells preprinted laser check forms for $182.50 per 2000, or nine cents each. If you're not writing, say, 300 checks a month, printing your own checks, while convenient, may not be financially worthwhile. Finally, before paying for an MICR cartridge, check with your bank. If bank officials balk, stand your ground—or change banks.

MOVING THIS WITH OTHER IMAGE EDITORS IS ALMOST AS PAINFUL AS TRYING IT IN REAL LIFE.

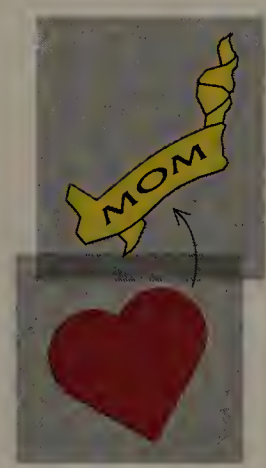
INTRODUCING NEW PICTURE PUBLISHER 4.0.

Are you sure you placed that image exactly where you want it? Unless you're working in new Picture Publisher® 4.0, you'd better be. Because once an image is placed in other image editing programs, it's there for good.



Most image editors combine bit-map elements on a single plane, which leaves a hole when an image is moved.

Layers™ feature, compositing images has never been easier. All images are placed on separate planes so they can be moved and edited again and again without affecting other objects.



Picture Publisher's Object Layers keeps images in layers so they can be moved and edited without affecting other layers.

To make keeping up with files easier, Picture Publisher's ImageBrowser™ shows thumbnails of images with search and cataloging capabilities. Plus our new Color Correction option visually adjusts images based on corrected thumbnails.

Any image editor can help you change a photo. But Picture Publisher with Object Layers actually lets you change your mind.

So instead of starting over, why not get off to a better start with Micrografx® Picture Publisher 4.0 for Windows.® With our Object Layers™ feature, compositing images has never been easier. All images are placed on separate planes so they can be moved and edited again and again without affecting other objects.

Picture Publisher gives you an amazing array of tools to help increase your productivity. Such as FastBits,™ that lets you select just the portion of the file you need and quickly load it into memory for retouching. This dramatically increases performance over working on an entire file.

Feature	Micrografx Picture Publisher®	Adobe Photoshop®	Aldus PhotoStyler®
Affordability (SRP)	$595	$B95	$795
FastBits	Yes	No	No
Object Layers	Yes	No	No
ImageBrowser	Yes	No	No
On-screen Text Entry	Yes	No	No

Users Of Competitive Software, Call Now 1-800-697-3310 And Get Picture Publisher 4.0 For Only

$149.95

Regularly $595 SRP. Offer good until Sept. 30, 1993

M I C R O G R A F X®

PICTURE PUBLISHER 4.0

©1993, Micrografx, Inc. All rights reserved. Micrografx and Picture Publisher are registered trademarks of Micrografx, Inc. All other products are trademarks or registered trademarks of their respective owners.

Circle 183 on reader service card

then compute federal and state withholding, Social Security, Medicare, and unemployment, among other calculations. If you have special earning categories, such as a 401(k) plan, QuickPay can figure that too. It accepts a variety of pay schedules including salaried, hourly, and commissioned. Paychecks are transferred into Quicken for DOS, Quicken for Windows, or QuickBooks automatically, and you can easily print all the payroll reports you need to complete your company's 940s, 941s, and W-2s. List price: $59.95. Intuit, 800/624-8742.

Reader service no. 631

Faxing for Dollars

Another great way to save money is to use your fax machine instead of the mail. Local calls are free, of course, so you save the cost of postage. If you're faxing from coast to coast, you can send a two-page, double-spaced document for 14 percent less than you'd spend on a first-class stamp. Wait until evenings or weekends, and you can save another 50 percent. Be sure to purchase fax software that lets you schedule unattended mailings during less-expensive evening hours (see "Windows Fax Software" in the February issue of *PC World*).

The cost of sending 15 two-page letters, comparing postage and phone charges only

Daytime, local		
Fax $0		
Mail		$4.35
Daytime, coast to coast		
Fax	$3.75	
Mail		$4.35
Nighttime, coast to coast		
Fax	$1.95	
Mail		$4.35

Source: Richard B. McKenzie, professor in the Graduate School of Management, University of California, Irvine, and author of The Economy of Faxing: A Technological Threat to the Mail Monopoly.

Zipper Payroll 1.6

✔SHAREWARE If you own a small company, sending your payroll to an outside firm can cost a bundle. A company with ten employees typically pays at least $780 per year to have its payroll done. Using Zipper Payroll and paying a clerk about $12 an hour, your company should be able to cut payroll costs in half and possibly save even more. Zipper Payroll is a stand-alone program that automates weekly, biweekly, semimonthly, and monthly payrolls. Zipper Payroll lets you have three hourly rates for employees and easily compute vacation, sick pay, tips, and commissions. What will it really cost to give an employee a raise? What impact does overtime have in a given pay period? Use Zipper Payroll's handy "what if" payroll analysis for quick answers. The program also calculates all necessary state and federal taxes, and the registration fee includes the following year's tax table update. Zipper Payroll can export data to Quicken and supports a range of printers. Look for it as ZPACK1.ZIP and ZPACK2.ZIP on PC World Online and other online services. Registration fee: $62. SoftCraft, 206/728-8427, 206/337-1842 (fax).

Reader service no. 632

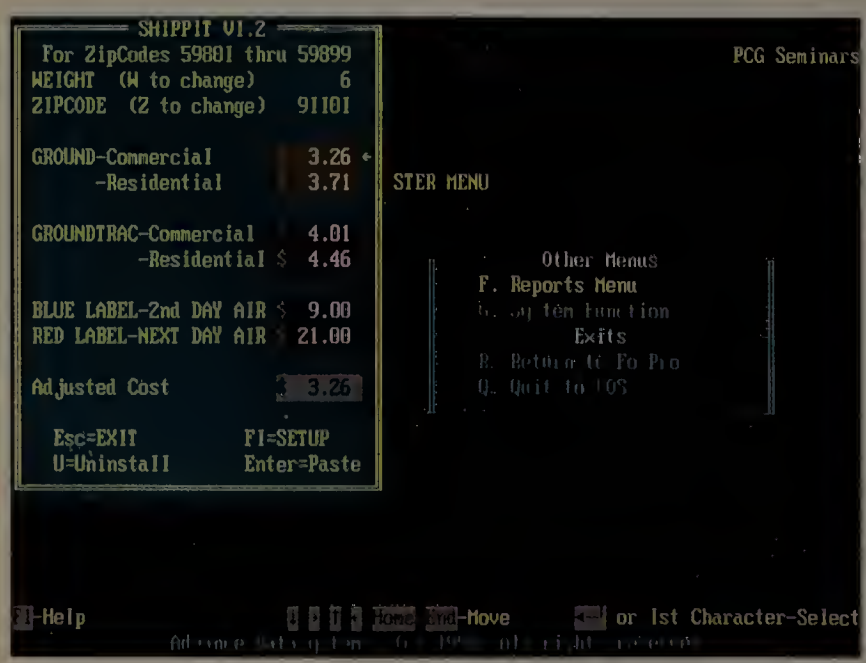


FIGURE 2: SHIPPIT LETS YOU DETERMINE the cost of sending a package via UPS—and avoid overpaying.

Shipping

CPSLite

Are you writing the correct weight and zone in the United Parcel Service pickup record book? If you're not, you may be overpaying. Even if you're shipping only a few parcels, you can automate the process—and yield some yen—with CPSLite. CPSLite eliminates UPS's time-consuming manual pickup record book—and virtually eliminates errors at the same time—by generating a UPS-accepted manifest and processing parcels for UPS services. You can calculate shipping charges, print labels and COD tags, and maintain a shipping history. The program's data files use dBASE III, although you can import data in ASCII, DIF, and WKS formats. List price: $199.95. Harvey Software Inc., 800/231-0296, 813/482-8600, 813/482-3257 (fax).

Reader service no. 633

Shippit 1.0

✔SHAREWARE Figuring out the shipping price for UPS is a hassle. You can waste money if you don't calculate the ZIP, weight, and zone correctly. But Shippit, a TSR, calculates UPS costs for you. Just enter the ZIP and the weight; Shippit tells you the cost for Ground, Groundtrac, Blue-label and Red-label packages (see **FIGURE 2**). Once you provide a local UPS rate chart, the service customizes the program for your area and notifies you of rate changes. Shippit's available as SHIPPIT.ZIP on PC World Online and other online services. Registration fee: $39.95. Computer Consulting Group Inc., 503/488-3237.

Reader service no. 634

Steve Bass is a contributing editor for PC World *and president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 12 for contact information).*

The Choice Is
No Longer
Black And White.

Introducing The ColorBook!

For the same money, you can have a black-and-white 486 notebook. Or you can have a color 486 notebook. Which is it going to be? Hay, it's not too hard to spot the best deal: the ColorBook from Gateway 2000! The new ColorBook has everything you're looking for in a portable at a price you'd expect to pay for a monochrome system. That's a special breed!

Exploding The Myth

Why do you expect to pay so much more for a color portable? Because other manufacturers always charge a plump premium for color. They've been milking the market, brainwashing you into thinking high-quality color costs a lot more to manufacture. It doesn't! We're selling the ColorBook for our usual cost-plus-small-margin. Now other companies will have a hard time perpetuating the color portable price myth. (Competitors absolutely *hate* us! Isn't it great?)

Experts' Reaction

We gave several PC trade publication editors a sneak preview of the ColorBook. Here's what they said about it: "Way cool!" "Dead on." "You won't be able to make enough of these."

Dazzling Color Display

The editors were impressed by the bright, crisp color graphics from the latest-technology, dual-scan STN display. It's a 9.4-inch VGA LCD, backlit for use in any lighting conditions. The editors said the ColorBook has the best STN color display they had ever seen! When they learned one model was priced *less than $2,000*, they were convinced the ColorBook will cause a stampede in the industry.

No Compromise On Size

Adding color to a portable usually means adding weight and bulk. Not so with the Gateway 2000 ColorBook. The ColorBook is the thinnest color notebook on the market — 1.77

inches. Its footprint measures
only 11.7 x 8.5 inches, and it weighs just 5.4 pounds.

486 Power

You don't have to sacrifice performance to have color, either. ColorBook models are based on Intel® 486 processors. Both ColorBook models include a floppy drive, 4MB or 8MB of RAM (upgradeable to 20MB), and a large, fast hard drive. These notebooks are powerful enough to become your only computer!

Integrated Track Ball And PCMCIA Slots

The ColorBook includes a built-in track ball, which is much easier to use than a mouse in most portable situations. You also get two PCMCIA Type II card slots so you can plug in dozens of available PCMCIA peripherals.

Greener Pastures

The grass *is* greener on the ColorBook side of the fence! It's an extraordinary value even by Gateway's standards — and we wrote the book on value! We have a reputation for offering the best prices on high-quality products with exceptional service from friendly folks in the Midwest. That's why the choice of a computer supplier is black-and-white, even when you're buying a color notebook! Give us a call.

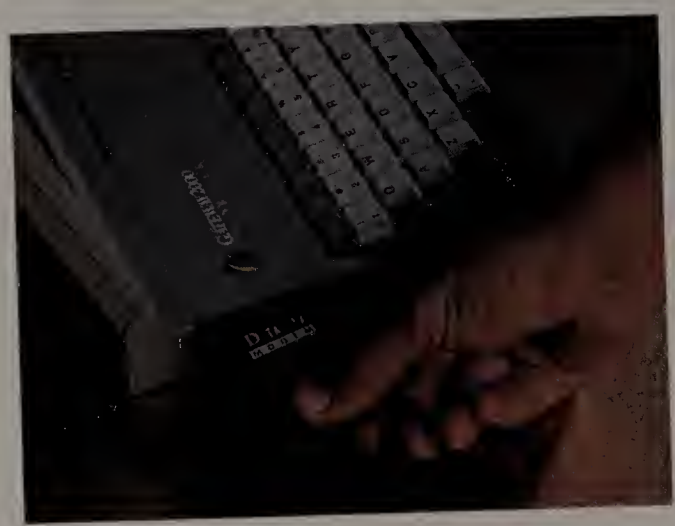
GATEWAY2000

"You've got a friend in the business."®

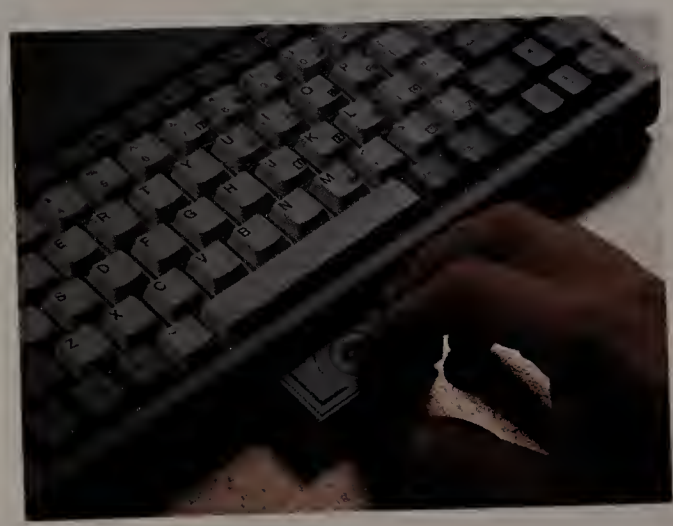
800-846-2030

Introducing The ColorBook!

The ColorBook is the thinnest color notebook on the market — 1.77 inches. Its footprint measures only 11.7 x 8.5 inches, and it weighs just 5.4 pounds.



You'll appreciate the convenience of using PCMCIA cards. They're as easy to carry as credit cards, and they plug right into your ColorBook.



The integrated track ball slides out from a compartment by the space bar on the keyboard. You simply pull it out and go to work. Finished? Just slide the track ball back into the ColorBook.

FEATURES

Size

With the ColorBook, you get great color at a great price while maintaining excellent portability.

Intel® 486 Processor

ColorBook notebooks are based on Intel 486 microprocessors, which makes them powerful enough to serve as your desktop PC with an external mouse, keyboard and monitor. Supports simultaneous video, up to 1024 x 768 resolution.

Dual-Scan STN Color Display

Dual-scan STN color is the latest technology in portable color displays, and it looks fabulous! You get 256 colors with the ColorBook running in VGA mode (640 x 480 resolution).

PCMCIA Type II Slots

Add a modem, network card or any of dozens of available PCMCIA-compatible peripherals. The ColorBook's two Type II slots can also be used for one Type III PCMCIA card.

COLORBOOK 486SX-25

- Weight: 5.4 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
- Intel 25MHz 486SX Processor
- 4MB RAM (expandable to 20MB)
- 3.5" 1.44MB Diskette Drive
- 80MB IDE Hard Drive
- 9.4" Backlit VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II Slots
- Integrated Track Ball (2 Buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2 Mouse Ports
- External CRT Port
- MS-DOS® and Windows™

$1995

COLORBOOK 486SX-33

- Weight: 5.4 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
- Intel 33MHz 486SX Processor
- 4MB RAM (expandable to 20MB)
- 3.5" 1.44MB Diskette Drive
- 170MB IDE Hard Drive
- 9.4" Backlit VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II Slots
- Integrated Track Ball (2 Buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2 Mouse Ports
- External CRT Port
- MS-DOS and Windows

$2395

TRAVELER'S PACK

- Carrying Case
- Extra NiMH Battery
- PCMCIA Fax/Modem

Call For Details

COMBO PACK

- 124-Key AnyKey Keyboard
- MS Mouse
- 15" Color CrystalScan 1572FS

$499

Options include: PCMCIA fax/modem cards, PCMCIA network cards, 4MB or 16MB RAM upgrades, carrying case and extra NiMH batteries. Call for details.

intel inside

GATEWAY2000

"You've got a friend in the business."®

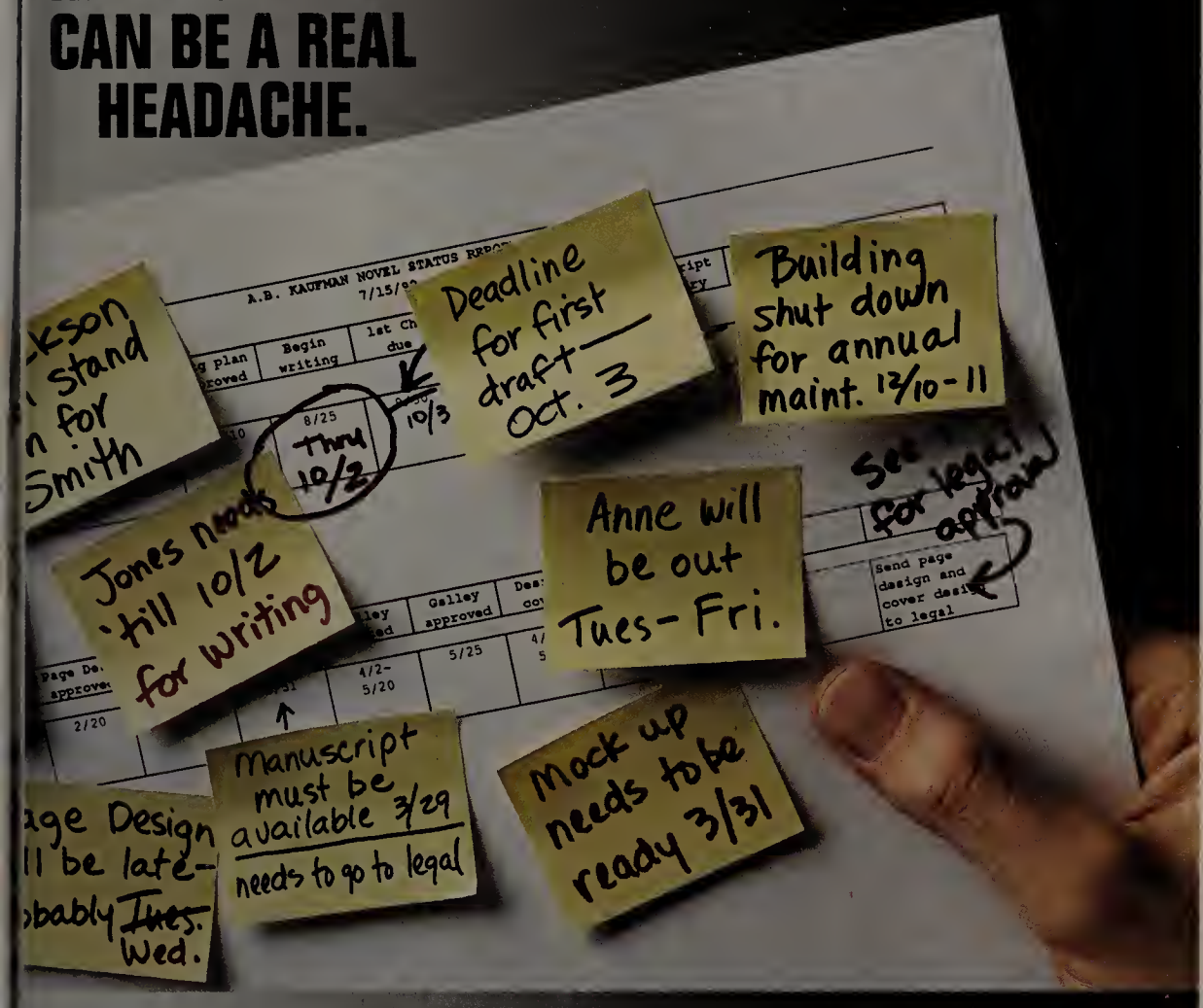
800-846-2030

610 Gateway Drive • P.O.Box 2000 • North Sioux City, SD 57049-2000 • Phone 605-232-2000 • TDD 800-846-1778 • Fax 605-232-2023 • FaxBack 605-232-2561

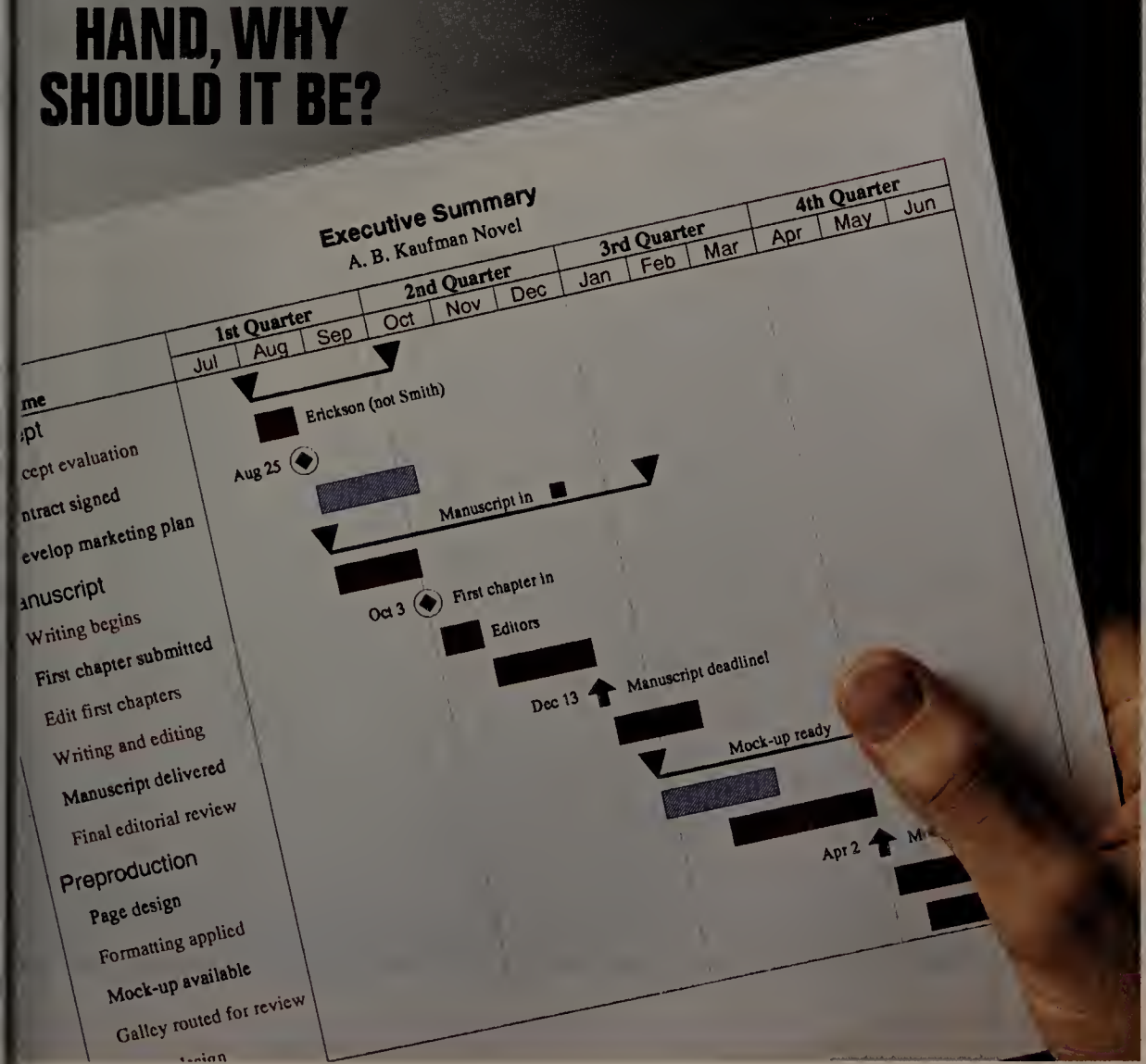
Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (Central Time)

©1993 Gateway 2000, Inc. Black-and-white spot design, "G" logo and "You've got a friend in the business" slogan are registered trademarks, and Gateway 2000 is a trademark of Gateway 2000, Inc. The Intel Inside Logo and Intel are registered trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies. Prices and configurations are subject to change without notice. Prices do not include shipping.

ON ONE HAND, PROJECT MANAGEMENT CAN BE A REAL HEADACHE.



ON THE OTHER HAND, WHY SHOULD IT BE?



You work hard enough planning your projects; why not let Microsoft® Project 3.0 for Windows™ help you make it easier?

With clear graphs, you'll be able to see and communicate your project even better–from the tiny details to the big picture.

Changes? No problem. For every revision you make, Microsoft Project helps you see how it will affect the entire job.

Assigning a new job? Just click the People button. Want to know who's doing what, when? Microsoft Project can help you keep track of everyone.

And if you need to get off to a fast start, use PlanningWizards to guide you step by step. Soon, you'll have great-looking, easy-to-read reports that make all your plans perfectly clear.

You can even exchange files between Microsoft Project on your PC and your Mac.® Either way, why not plan on the leading project management software? Microsoft Project 3.0 – it takes the pain out of planning.

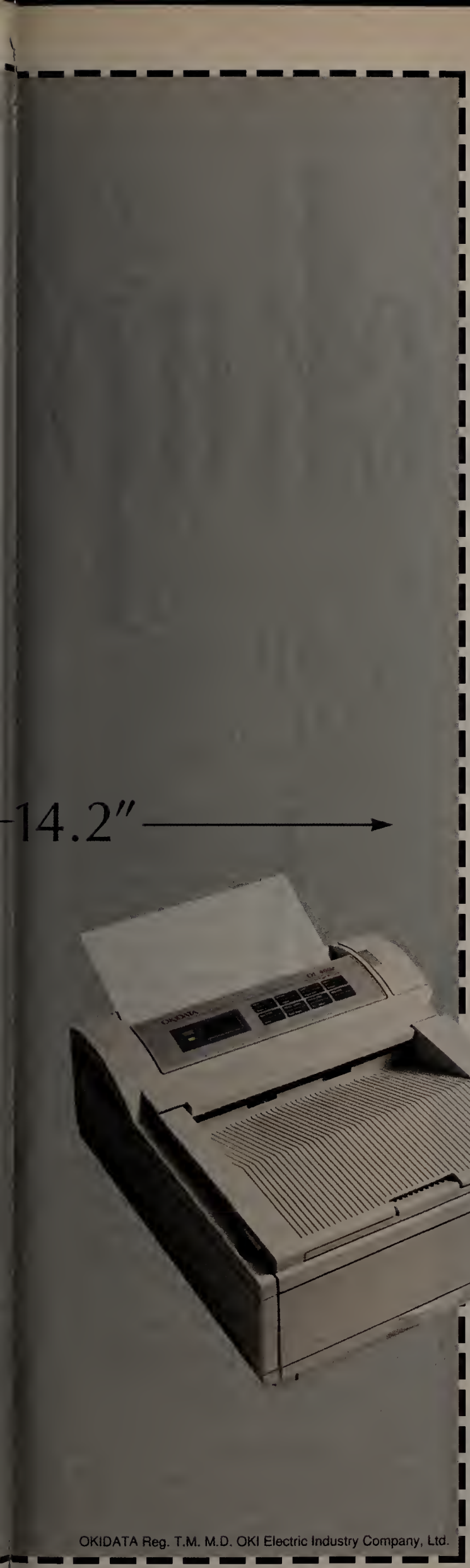
Microsoft
Making it easier

For more information inside the 50 United States, call (800) 426-9400, Dept. JM2. Outside the U.S. and Canada, call (206) 936-8661. Customers in Canada, call (800) 563-9048. © 1993 Microsoft Corporation. All rights reserved.
Printed in the USA. Microsoft is a registered trademark and Windows and the Windows logo are trademarks of Microsoft Corporation. Mac is a registered trademark of Apple Computer, Inc.

THE NEW OL400e: NO LASER PRINTER MEASURES UP TO OUR FEATURES AND DOWN TO OUR SIZE.

(Diagram not actual size, but you get the idea, it's a small printer.)

12.6"



THE OKIDATA OL400e LED PAGE PRINTER INTRODUCES A NEW FORM OF BUSINESS ECONOMICS. SPEND LESS. GET MORE. Not only is it small, but the OL400e is loaded with features that you'd normally find only in larger, higher-priced laser printers and has *more* features than you'd have to settle for in ordinary inkjet printers.

Okidata's solid-state printhead delivers laser perfect sharpness with LED reliability. Reliability backed with a five-year printhead warranty, the lengthiest in the industry. Under the OL400e's compact 14.2″x 12.6″case is a built-in 100 sheet paper tray. You can print transparencies, cards, labels, and envelopes, and collate them, too. The OL400e's microfine toner gives every printed character a smoother, cleaner edge. And you can choose your favorite smooth characters from 44 internal fonts–all this at an industry standard 4 pages per minute.

The Okidata OL400e is not only PC-compatible, it's wallet-compatible. So if you've put off buying a printer, and have a square foot or so to spare, telephone 1-800-OKI-TEAM, EXT. 289 for the dealer nearest you. And find out how much more you can get by spending less.

OKIDATA Reg. T.M. M.D. OKI Electric Industry Company, Ltd.

THE OL400e BY OKIDATA®
a Division of Oki America, Inc.

Circle 140 on reader service card

Backup

Flexible options and easy automation highlight the Best Buys among nine top floppy and tape backup programs.

BRIAN CRONIN

A backup system is as indispensable for your PC as insurance is for your home or car. But you shouldn't have to spend precious work time making sure your data's safe. With auto or home insurance, you specify the protection and file the policy, confident you're protected. A good backup system has to work the same way, ready to pick you up in case of a fall, but out of the way until you need it.

A sound backup strategy requires regular sessions to keep backups current and to minimize potential losses. We recommend at least one full hard disk backup a week and one daily backup of modified files. But a system shouldn't force you to choose between backing

Software

Cheap Insurance for Priceless Data

up and meeting a deadline.

Fortunately, data security is high for all the backup programs here. But usability is the key to regular backups—and full protection. To help you make your backup buying decision, we looked at nine top programs that handle both DC2000 minicartridge tape units and floppy disk drives. Seven were shipping products. Two, Fifth Generation Systems' Fastback Plus 6.0 and Fastback Plus for Windows 1.1, were in prerelease (see "Fastback Upgrades: Ripe With Promise").

Cost isn't a huge factor: The most expensive program here, Sytron's Sytos Plus 1.4, lists for $225. The other prices dip as low as $79 for the price-leading Gazelle products.

In addition to data security, usability was our main concern. We believe you should be able to set up a program easily to fit your working style and never have to think about it again. That's the kind of usability you can expect from our four Best Buys: Central Point's PC Tools 8.0 and PC Tools for Windows 1.0 and Symantec's Norton Backup for DOS 2.2 and Norton Backup for Windows 2.2.

Don't be confused by the backup utility in Microsoft's DOS 6.0. While it was derived from Symantec's Norton Backup and has better functionality than prior DOS versions, it doesn't support tape drives, data compression, or fast direct memory access (DMA) transfers, so its usefulness is limited.

The Tape Backup Connection

If you want the security and convenience of full backups and you have one of the 80MB or larger hard disks typical of today's business PCs, your most practical backup hardware solution is a tape drive: Affordable QIC-80 format DC200 drives start at around $200 on the street. They can back up approximately 250MB of files using data compression—a comfortable fit for full backups on drives from 100MB to 200MB, leaving room to append several modified-files backups.

Because tape drives are now such an essential component in an efficient backup strategy, we included a guide to DC2000 tape drives with information on 31 products from 13 vendors (see the table "Minicartridge Tape Drives: Big Backups Come in Small Packages").

Every product here provides sound data security. All except Sytron's Sytos Plus can check the hard disk to make sure you aren't backing up disk errors. And all the products except the Gazelle DOS package, the Symantec products, and Sytos let you integrate a virus check.

They even guard against operator error by popping up a warning before restoring over existing files.

Automated Safety

Would you want to have to remember to recharge your car's air bag every day? Of course not. So why should you have to remember a daily backup? If you're forced to depend on your memory, chances are that other squeaky wheels will absorb the grease and you'll forget to back up. Fortunately, none of these

By TJ Byers and Rex Farrance

backup packages makes you tie a string around your finger. You can set up a schedule just once, and from then on backups will take care of themselves. Unlike many of the packages that come bundled with tape drives, all these programs back up multiple drives and partitions, which makes for true set-it-and-forget-it backups.

DOS programs always prompt you to shut down your other applications. Windows products, however, take the inside track by running backups while you're working on other applications. Although you can run full backups in the background, it makes sense to reserve this option for backups of modified files, which take less time. But full backups of 100MB of data took these Windows packages anywhere from 40 minutes to over 2 hours. (For more details, see the Test Center Report.) Generally, if you run a backup, restore, or verify in the background, it will take at least twice as long to complete, meanwhile degrading application performance.

Starting, Scheduling, and Easy Selections

Usability begins with installation, and Sytos's is automated ease. Gazelle's Back-It 4 1.4, on the other hand, makes you tweak the CONFIG.SYS and demands a separate tape drive installation step.

As for backup scheduling, all the programs here make it easy: You either click on a date and time or fill in your selection on a scheduling form. Creating setup files containing all the information you need to perform an unattended backup is also a snap.

Flexible and intuitive file selection is a must. All the programs let you include and exclude files by wild card masks (such as *.WK? for all your 1-2-3 worksheets) and dates, and each package lets you select directories from a tree display. But unlike the Best Buy Central Point and Symantec products, which let you select files and directories with a mouse click or two, the Gazelle and Sytron products make you negotiate several screens.

Backing Up Fast

If you're backing up to floppies, you'll really appreciate quick backup speed. Tape drives make speed much less important, as you generally won't need to change your media. Still, it's good to know you can get your disk backed up on your lunch hour.

To test performance, the PC World Test Center created benchmarks that simulate typical business tape backup tasks, including a full backup, both incremental and differential modified-files backups, and a selective restore. The Best Buy Norton Backup products were the fastest programs overall.

So which programs let you set your own backup agenda most easily? Our Best Buys. PC Tools 8.0 and PC Tools for Windows come with a bevy of disk care and data recovery utilities, and Symantec's programs are the fastest packages available. To put the Best Buy seal on four packages is unusual for us. But there's no way to misread the tale of the tape. These Best Buys measure up so well that we'd entrust our most important work to any of them.

TJ Byers is a contributing editor and Rex Farrance an associate editor for PC World. *They can be reached on PC World Online (see page 12 for contact information). Research and support services provided by John Goddard.*

For more information about all products in this article, circle reader service no. 902.

Best Buys

This month's backup software winners have representatives in both the DOS and Windows camps, so whichever is your favorite working environment, you can find the easy street to solid security.

OUR BEST BUYS, Central Point's PC Tools 8.0 and PC Tools for Windows 1.0 and Symantec's Norton Backup for DOS 2.2 and Norton Backup for Windows 2.2 make it a snap for DOS and Windows users to keep their hard disks backed up.

Central Point PC Tools 8.0

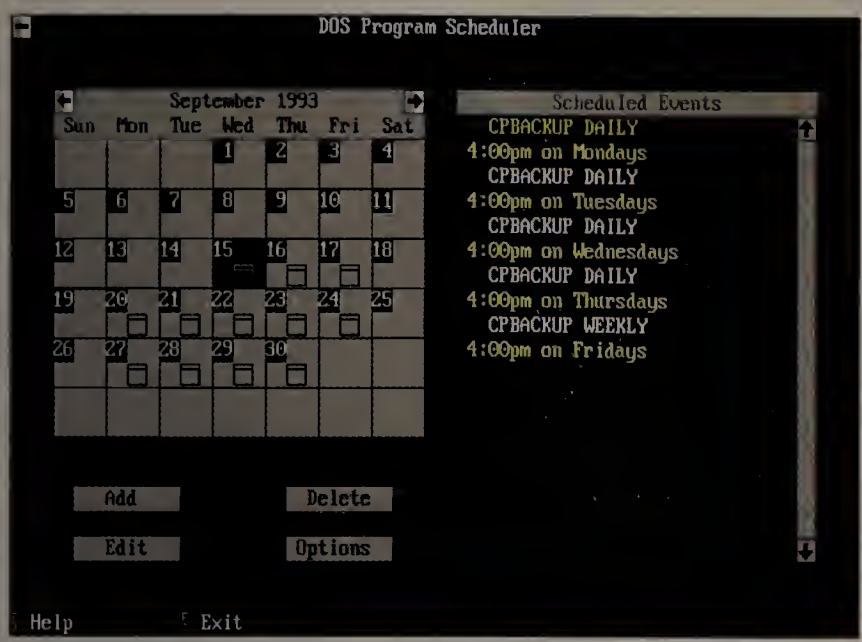
PROS: Super setup and scheduling, disk protection, and productivity utilities
CONS: File scrolling somewhat slow

PC Tools 8.0 earned a Best Buy in our July review of disk care programs, but this utility collection's talents don't end there. PC Tools provides terrific backup protection and supports the most popular types of DC2000 minicartridge tape drives, including QIC-40/80 and Conner AccuTrak (Irwin Servo) drives, as well as many high-capacity SCSI tape drives.

While the backup component of this $179.95 utilities collection is also available as a stand-alone, we chose PC Tools 8.0 because it comes with the most current version of Central Point's DOS backup utility. If backing up is all you want to do, you should be able to find the updated $129.95 Central Point Backup for DOS 8.0 on sale by the time you read this. But we'd gladly pay the extra $50 to get the data recovery tools, antivirus utility, disk optimizer, and more.

Creating setup files is a snap, and you never have to travel more than one level to find the tools or files you need. The program also lets you name your backup sets—handy when you have to find a specific set of files to restore. Scheduling is a breeze with the monthly calendar, which indicates the days earmarked for unattended backup or restore. Click on a date, and you can schedule as many different events as you wish and repeat the pattern daily, on weekdays, weekly, biweekly, or monthly.

This version includes tape tools for retensioning, formatting, and the like, which are just a click away from the Backup, Restore, or Compare menus. And PC Tools 8.0 was the third fastest program overall. The only place you'll notice a slowdown is in the scrolling and display of file selections in file-laden directories. If that sounds



CHOOSING DAYS, TIMES, AND TYPES of backups is a snap with PC Tools 8.0's scheduling calendar.

BENEATH ITS EASY-ACCESS TOOL BAR, PC Tools for Windows' selection screen shows its coded icons.

like nit-picking, it is. This is a fantastic program, and using Best Buy PC Tools 8.0 to back up and protect your data is like putting money in the bank.

Central Point Software, 503/690-8090 **Reader service no. 632**

Central Point PC Tools for Windows 1.0

PROS: Super setup and scheduling, disk protection, and productivity utilities
CONS: None

WINDOWS Like its DOS counterpart, PC Tools for Windows 1.0 won a Best Buy in our July disk care review. And why not? With its superb Windows desktop metaphor and disk optimizer, its accessible data recovery tools, and more, this collection stands out in the Windows crowd, and its backup program is also top drawer. Central Point even throws in a fistful of backup sets configured to handle the most likely backup strategies: If you have more than one drive, you can edit sets to include other drives with a couple mouse clicks.

Need to restore a file? Simply select its backup set and click its name, or select the Search History button, type in the name, and let the program find the file for you. Scheduling? Like PC Tools 8.0, it's as easy as it comes. Wide-ranging tape drive support? Virus protection? PC Tools for Windows 1.0 has it all.

PC Tools for Windows' backup capabilities match that of its DOS counterpart, with the Windows advantage of background backups. This backup program is a Best Buy all by itself. But when you plug into the full PC Tools for Windows collection, you'll see the light—this package is a must-have for Windows users.

Central Point Software, 503/690-8090 **Reader service no. 633**

Gazelle Back-It 4 1.4

PROS: Bargain price, excellent tape drive support
CONS: Can't click on individual files for backup, limited scheduling

If you want to back up on a budget and can live without some of the flexibility of the Best Buy programs, $79 Back-It 4 1.4 from Gazelle is worth considering. Gazelle's tape drive support is among the best, and Back-It 4 can handle the most popular QIC-40/80 DC2000 drives. While there's no support for Conner AccuTrak drives, Gazelle works with many SCSI DC6000 ¼-inch cartridge drives as well as some digital audio tape (DAT) drives.

Aside from a quirky installation, the program is simply structured and reasonably easy to use. You select functions from layered menus, but there are no shortcuts. To choose a single file, you have to select its directory and type the file name.

Restore provides its own brand of tedium. You have to rummage through the tape's backup sets, one at a time, manually requesting file lists until you find the set or sets containing your files. Fortunately, there's a history search that can find all occurrences of a specified file or wild card combination.

The scheduler lets you schedule only one backup per day, and all must occur at the same hour. Back-It 4 is a reasonable choice for users who need low-cost tape support. But if you can afford the extra dollars, you'll be happier with one of our two DOS Best Buys.

Gazelle Systems, 800/786-3278 **Reader service no. 634**

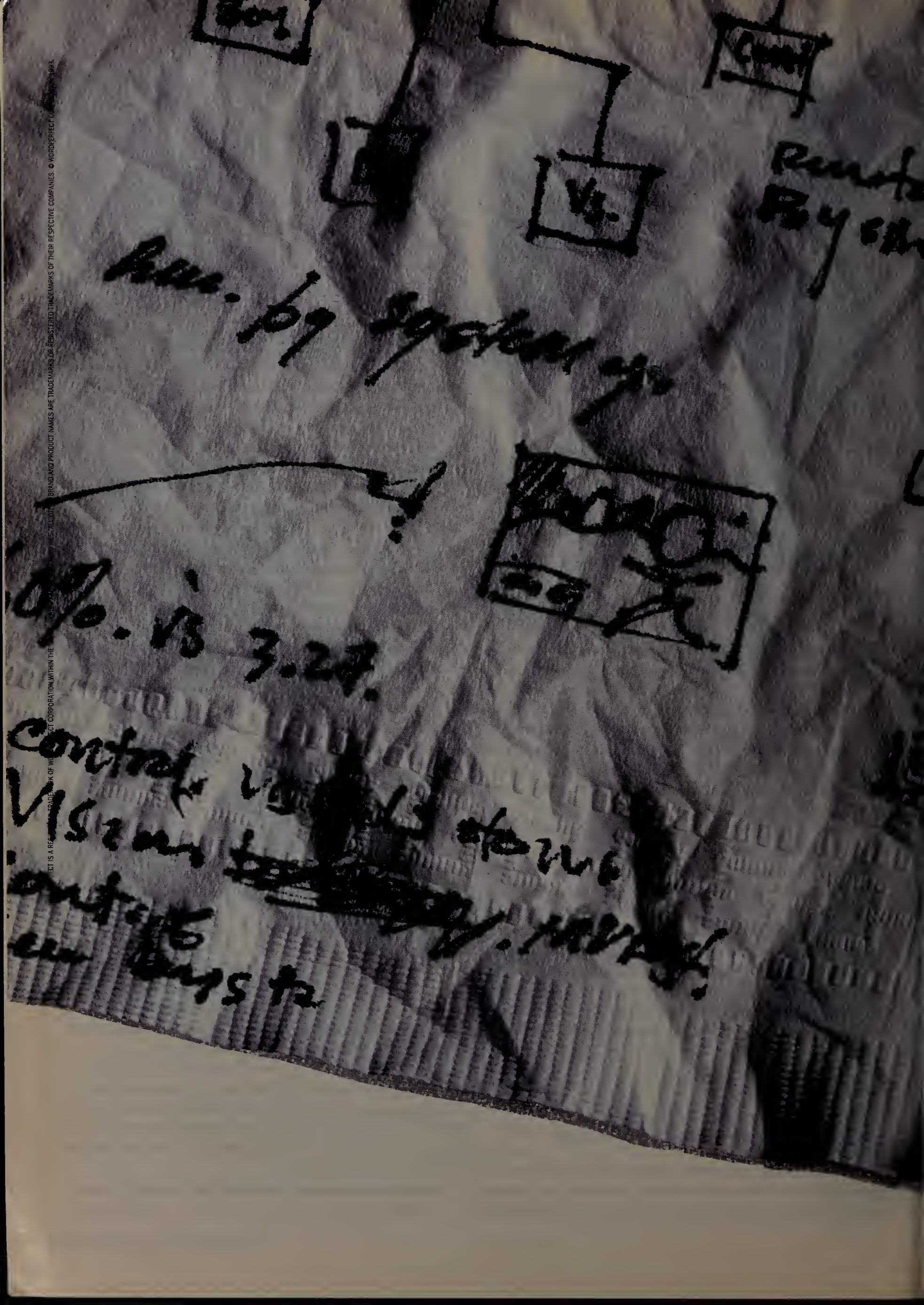
Gazelle Back-It for Windows 1.2

PROS: Bargain price, virus checker, excellent tape drive support
CONS: Limited scheduling, DOS and Windows backups not interchangeable

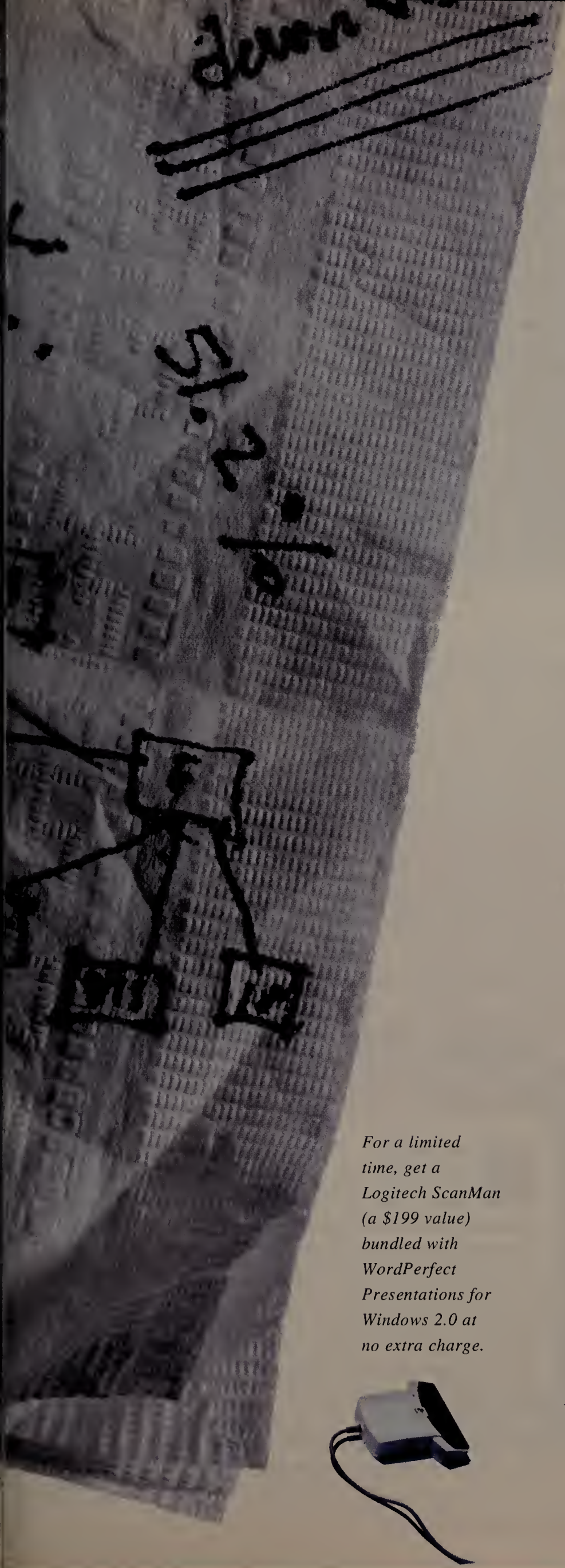
WINDOWS Although Back-It for Windows 1.2 sells for the same low $79 as its DOS counterpart, the two are not twins in features or capabilities. The Windows version has improved on some features and dropped others—such as LAN support. The biggest improvement is the backup directory tree, which now lists files by name, size, and date. But as with Gazelle's DOS version, there are no incremental or differential strategy choices.

The restore function as a whole is unimproved, and you can't even use the DOS program's history search. That means your file searches must proceed manually—one backup set at a time—from oldest to newest. And unlike the Best Buy Central Point and Symantec DOS/Windows siblings, backup files aren't interchangeable between the two programs.

The scheduler also missed the upgrade bus. You're still limited to the inflexible one-a-day, same-hour scheduling. This program does



ORPORATION WITHIN THE ... ES. ALL OTHER BRAND AND PRODUCT NAMES ARE TRADEMARKS OR REGISTERED TRADEMARKS OF THEIR RESPECTIVE COMPANIES. © WORDPERFECT CORPORATION 1993.



OK. The presentation looks great.

On a napkin.

But you can't pass that around a boardroom.

Now you're stuck.

You can't draw. You can't paint.

And faking a heart attack is out of the question.

Introducing WordPerfect® Presentations for Windows. The most comprehensive software of its kind. With it creating impressive presentations with overheads, slides, 3-D charting, sound, and video clips is a cinch. Even if the last picture you drew was in summer camp. And no other major presentations package comes with more clip art images or lets you scan and customize your own. Just think, you may never need to take another sick day again. For a free demo disk call 1-800-526-5058.

When it's got to be perfect,

it's got to be WordPerfect Presentations.

For a limited time, get a Logitech ScanMan (a $199 value) bundled with WordPerfect Presentations for Windows 2.0 at no extra charge.

WordPerfect® Presentations
FOR WINDOWS

Fastback Upgrades: Ripe With Promise

Fifth Generation Systems created the PC backup genre with its first release of Fastback, and it still has a hefty market share. While Fastback Plus 6.0 and Fastback Plus for Windows 1.1 upgrades weren't available for this review, we looked at the new features in prerelease copies. Both versions will be priced at $149 list.

The interface is much improved. Users can now select files on a single screen by typing in file or wild card selections or by clicking on a directory tree. The 3-D Express menu also has simplified selections. Fifth Generation is adding antivirus protection, and both Fastback versions can still restore backups made with Fastback's Mac version.

The new scheduler backs up from the DOS prompt or by shelling to DOS from an application. Setup is divided into two steps. The first lists the drives and files to be backed up; the second uses a macro recorder that remembers the moves you made to create a particular backup strategy. You can link the two processes through the macro—or run them individually from a batch file.

Fastback Plus for Windows continues the look and feel of the DOS version. It wasn't as fully developed, and the macro scheduler, network support, and virus checking weren't fully implemented. But we saw enough to get a sense of what's coming. An impressive new feature that *was* working is a micro programming language that can turn backup sessions into icons.

Fifth Generation bundles in drivers for a profusion of QIC-40/80 and SCSI tape drives. And the network support is impressive, including saves of NetWare bindery and system files and peer-to-peer LAN backups.

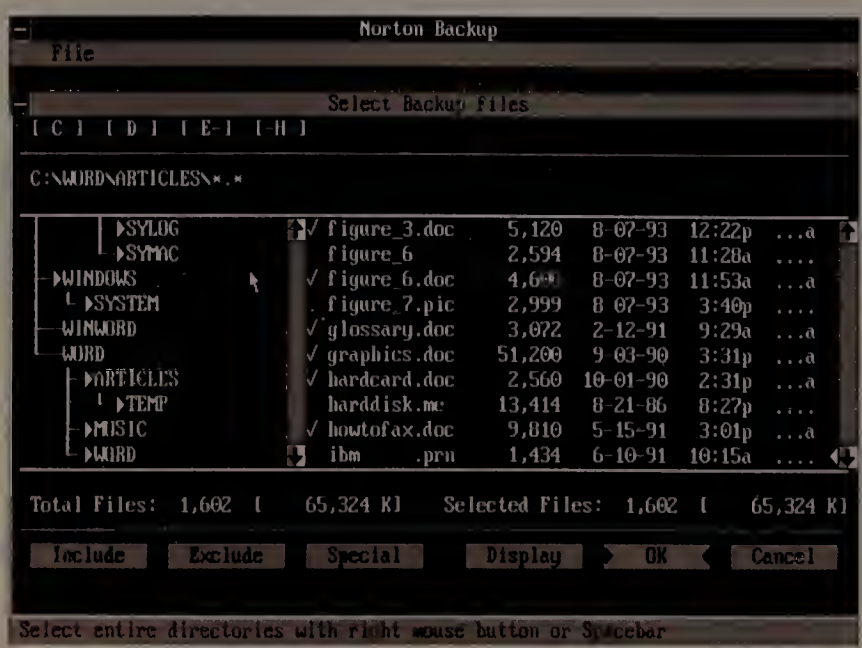
Without a full evaluation, we can't give buying recommendations. But if the shipping versions deliver the potential we saw in their betas, they should be hard to resist.
Fifth Generation Systems, 504/291-7221
Reader service no. 779

offer the advantage of Windows background backups, but it's also the slowest in our review. Unfortunately, Back-It for Windows 1.2 forces you to back up the Windows disk swap file, which eats up time as well as tape space. Gazelle informs us that Back-It for Windows 1.3—due later this year—will correct this deficiency. This is the least-expensive Windows tape handler we know of, and it even includes virus checking. But only a severe budget crunch should turn you away from our Best Buys.
Gazelle Systems, 800/786-3278 **Reader service no. 635**

Symantec Norton Backup for DOS 2.2

PROS: Fast, easy to use
CONS: None

If you want feature-rich backup from a program that's a cinch to install and use, Symantec's Norton Backup for DOS 2.2 delivers the goods. Creating setup files is fast and easy, with most setup parameters just a click away. Point-and-click file selection is as easy as plucking cherries off a tree, or you can just let the program find changed or missing files for you.



FILE SELECTION IS POINT-AND-CLICK in Norton Backup for DOS, with shortcut directions on screen.

Like the Best Buy PC Tools packages, Norton Backup uses a monthly calendar to show the days earmarked for unattended backup or restore. Clicking on a date lets you schedule as many events as you wish—with no limitation on type—and you can repeat the pattern daily, on weekdays, weekly, or monthly.

If speed is high on your wish list, Symantec's DOS program specializes in prompt delivery. It was fastest overall, with a noticeable edge on the next quickest program. Along the way, it posted top times on every tape benchmark. (Symantec's tape support is limited to the popular QIC-40/80 tape drives.) If you're looking for super speed and falling-off-a-log usability, Norton Backup for DOS 2.2 is a clear Best Buy.
Symantec Corp., 800/441-7234 **Reader service no. 636**

Symantec Norton Backup for Windows 2.2

PROS: Fast, easy to use
CONS: None

WINDOWS If you're a Windows user but you yearn for the performance of Norton Backup for DOS, don't despair. Symantec has another Best Buy program that demands little compromise in backup speed. Norton Backup for Windows 2.2 runs faster than most DOS utilities.

The one place where you'll notice a bit of slippage between the DOS and Windows versions is in the interface, where it takes more mouse clicks to get to the file-selection screen. But that's a small price to pay for the convenience of running backups without having to close shop on your other applications. And once you've set everything up, you'll rarely have to deal with manual selections.

The scheduler is identical to its DOS sibling's, as is the tape support. Symantec charges an extra $20 for its Windows version, pricing it at $149. That's still pretty reasonable for top-notch backup func-

The **NEW** under *$1000* TI microWriter PS23 is the best value in laser-quality PostScript printers.

23 SCalaBle PostScript typeface fonts in popular Adobe® PostScript® formats.

Crisp, * # Δ sharp graphics.

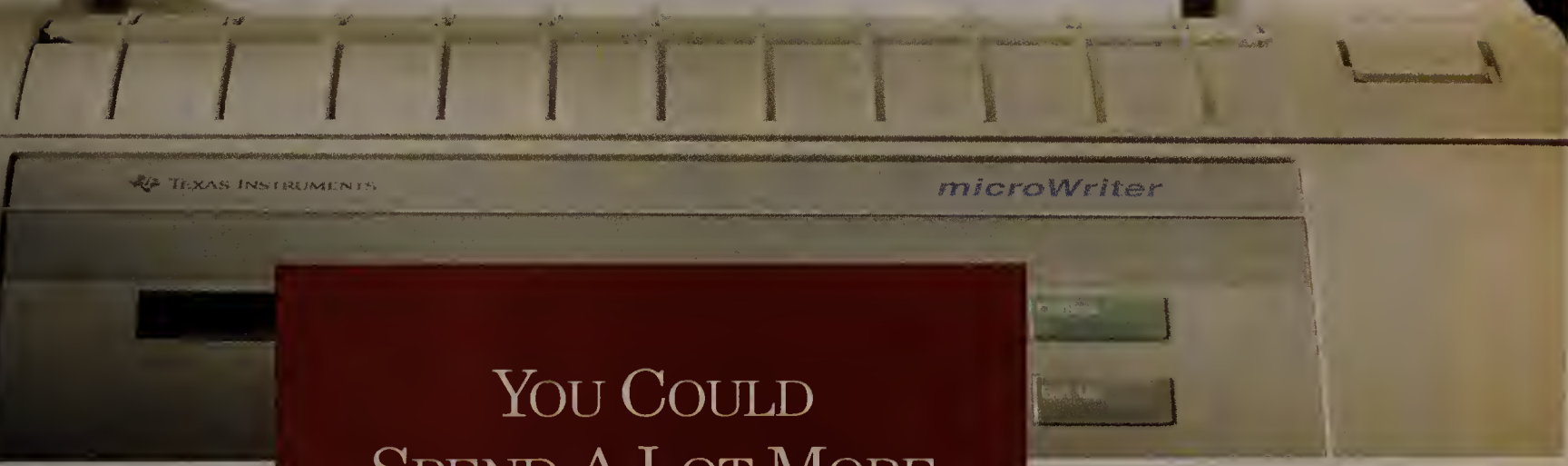
LED technology uses fewer Moving Parts than conventional laser printers for great reliability.

Automatically switches between **PostScript** and **HP LASERJET® II** printing formats.

☛ Easy to use front control panel.

"Plug and Play" convenience in both Mac® (Apple®) and Windows® (IBM®) environments.

With available options, can handle up to 3 trays of paper, including envelopes and labels.



YOU COULD SPEND A LOT MORE AND HAVE A LOT LESS TO SHOW FOR IT.

For years, capability and affordability were mutually exclusive features of laser-quality printers. But the new microWriter™ PS23 from Texas Instruments has changed all that. Now you can get sharp, crisp laser-quality images, rapid 5 page-per-minute operation and the reliability of LED technology. All in one very affordable printer. Thus enabling you to print more. Produce more. Do more. In other words, to extend your reach. The new TI microWriter PS23. It can make a small business look a lot bigger. And a big business look a lot smarter. For more information and your nearest dealer, please call *1-800-527-3500.*

EXTENDING YOUR REACH WITH INNOVATION™

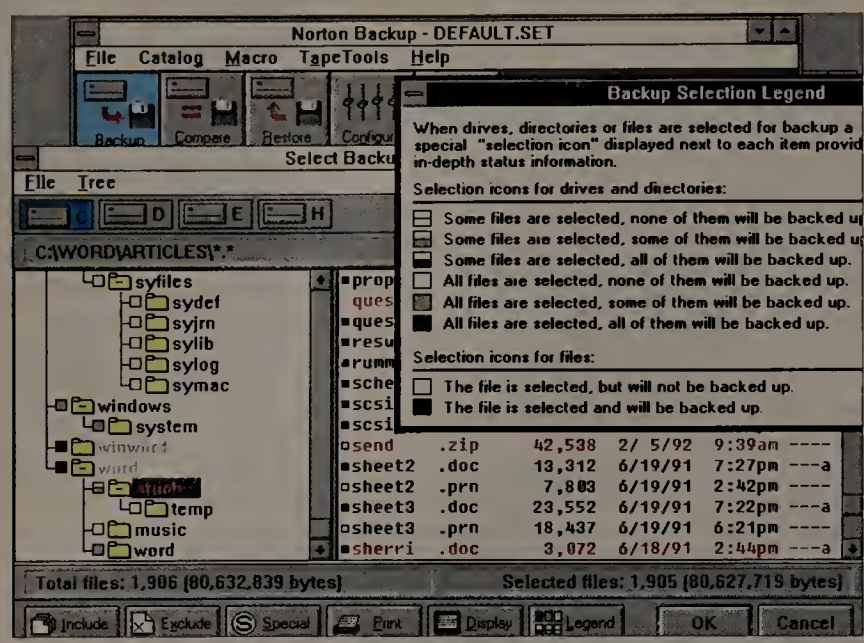
TEXAS INSTRUMENTS

PC WORLD BEST BUY

POSTSCRIPT Software From Adobe

Adobe PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. Apple and Mac are registered trademarks of Apple Computer, Inc. IBM is a registered trademark of International Business Machines Corp. Windows is a registered trademark of Microsoft Corp LaserJet is a registered trademark of Hewlett-Packard, Inc. "Extending Your Reach With Innovation" and microWriter are trademarks of Texas Instruments © 1993 TI.

Circle 242 on reader service card



NORTON BACKUP FOR WINDOWS OFFERS COMPLETE on-screen tools and explanations.

tionality. A lot of savvy users will pick up the $179 Norton Desktop for Windows 2.2 instead, thereby getting the full backup program; many of Norton Utilities 7.0's most useful data recovery tools; and Symantec's outstanding Norton Anti-Virus, which earned a Best Buy in May. You can't go wrong with any of the four top backup programs, but if you want the fastest Windows backup program around, Norton Backup for Windows is your top choice and an undisputed Best Buy.

Symantec Corp., 800/441-7234 **Reader service no. 637**

Sytron Sytos Plus 1.4

PROS: Versions available for most tape drives, excellent installation program
CONS: Highest price in review, hard to select files and create backup sets

Sytron has been a player in the tape arena longer than any other vendor here, and when you buy Sytos Plus 1.4, you're assured of a fit. Sytron provides specific versions of Sytos Plus to fit almost any tape drive. And this program has its charms, such as the nifty move function that copies files to the backup media, compares them, and erases the originals. It's also the easiest package to install, as it automates the whole procedure.

But its usability falls short of what you get with the Best Buys. To create or edit backup sets, you have to negotiate several screens to reach the directory tree and file listings. Restoration requires a similar procedure, except you have to step through backup sets instead. Sytos Plus will do a changed-file restore search—examining each backup set until all are found. Unfortunately, that means partial restores can take longer than a full backup, but the scheduler is simple yet powerful.

Sytos Plus won't run if there's any CPU activity, so you can't load your modem TSR before going home if you've scheduled to back up. On balance, this DOS veteran can't match up to the Best Buys. *At press time, Sytron lopped $75 off Sytos's $225 price and showed us a Windows version with an updated features set that looked so good we wished we'd had it in time for review. —Ed.*

Sytron Corp., 800/877-0016 **Reader service no. 638**

PC WORLD TEST CENTER REPORT

Norton Backup for DOS Is Fastest Overall

	Full backup	Incremental backup	Differential backup	Restore
Norton Backup for DOS 2.2*	35:24	2:26	5:33	4:38
Norton Backup for Windows 2.2*	39:39	3:10	7:28	6:27
PC Tools 8.0*	39:36	4:27	8:07	5:13
PC Tools for Windows 1.0*	41:53	7:12	10:22	5:22
Sytos Plus 1.4	36:20	2:32	6:30	[illegible]
Back-It 4 1.4	126:40	3:27	14:50	9:29
Back-It for Windows 1.2	140:41	7:14	24:20	10:06

*Best Buy

Products arranged in order of fastest overall performance. Times in minutes:seconds.

Methodology We tested all programs on an ALR Flyer 486SX-25 with 8MB of RAM, a Colorado Jumbo 250 tape drive, and a Quantum 240AT (240MB) hard disk running DOS 6.0 and Windows 3.1. The files were backed up using the highest level of data compression, and each backup session was appended to the sessions already on the tape. We didn't enable verification or compare, and we measured all times from when we launched a process until we regained control. The Windows applications were loaded and run in the foreground.

Full backup We did two full backups of the hard disk, which contained 138MB of data in 7873 user files spread among 58 subdirectories in the three logical drive partitions. Each full backup was done using a freshly formatted tape; they weren't appended.

Incremental backup Incremental backups select files that have been changed since the last full or incremental backup and then reset the archive bit to indicate they have been backed up. We selected the files for backup from seven to ten subdirectories spread among three logical drive partitions. We backed up an average of 1MB per day for 25 days and averaged the numbers.

Differential backup Differential backups select the files that have been changed since the last full backup. We did four differential backups with sizes of 5.6MB, 9.4MB, 15.8MB, and 22.2MB. The differential backups were added to the incremental backup tape at the end of 5-day, 10-day, 15-day, and 20-day intervals, respectively. The four differential times were averaged separately from the incremental times.

Restore We erased 2MB of files located in one subdirectory, then restored them using the fastest method the backup software provided.

Data based on tests designed and conducted by the PC World Test Center. Testing performed by TJ Byers. **All rights reserved.**

NO ROBIN HOOD, NO MERRY MEN, NO JAZZ CLUBS, NO GOATS IN PARTY CLOTHES, NO SCENIC AFTERNOONS IN THE COW PASTURE.

DELL DIMENSION XPS.
PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

GET A VIRTUAL
VIRTUALLY E

Virtual screen technology is like having two monitors in one. Create the mother of all spreadsheets. Run PageMaker and Excel side-by-side. Use your monitor as a viewfinder and pan across to the place you want to be. All it takes to upgrade to a 2048 x 1024 virtual screen is just 2MB of optional RAM (1MB VRAM, 1MB DRAM).

Our chameleon cursor can double in size and change color so it never gets lost. This is another feature you won't get from Gateway. They would rather have you engage in a game of hide-and-seek.

[1]*Performance measured by running WinBench 3.11 at 1024 x 768, 256 colors. Both cards configured with 1MB Video RAM. Dell and Gateway 2000 systems configured with 66MHz 486DX2 processor, 16MB RAM and 256KB*

SCREEN WITH VERYTHING.

*Our Resolution Exchange Panel gives you complete control over your desktop environment. And since the VL-Bus links video directly to your powerful 486DX2, your commands are executed instantly.**

Our Hawkeye Zoom Feature gives you up to four levels of magnification. Gateway will magnify your work too. But just once.*

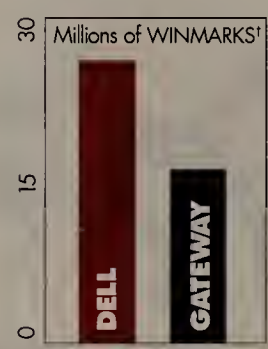
ORIGINAL SIZE

**Resolution Exchange Panel and Hawkeye Zoom examples given for #9GXE configured with 3MB RAM (2MB VRAM, 1MB DRAM) and 1280 x 1024 monitor.*

If you want to plug in a mouse, Dell gives you a dedicated mouse port. Gateway turns you into a serial killer.

Inside your Dell Dimension™ XPS PC is a #9GXE video card that will give you the ride of your life.

This fast and versatile video card uses the VL-Bus™ and ultra high-speed video RAM to deliver 26 million WINMARKS. That's ten million more than you'll get from the ATI UltraPro VLB card that's found in comparably equipped Gateway machines.†



†WINMARKS are just one way Dell leaves Gateway behind. We're as much as 62% faster.

But raw speed is just part of the Dell Dimension XPS story.

The Dell Dimension XPS's #9GXE video engine can be accessed on-screen via a control panel that allows you to configure a host of powerful utilities – from time-saving "hot keys" to a chameleon cursor – for total control of your desktop video environment.

Add our optional 2MB RAM upgrade (1MB VRAM, 1MB DRAM) and you have the power to switch the #9GXE into a virtual screen with a resolution of 2048 x 1024 pixels.

This versatile add-in effectively gives you the desktop equivalent of two monitors. So you can have two full-size applications like Excel and PageMaker displayed side-by-side.

The virtual screen allows you to seamlessly pan across your monitor from application to application.

When you need a closer view of your work, just press a "hot key" and you can zoom in and out of your screen with up to four levels of magnification.*

When it comes to video and video-related utilities, Dell Dimension XPS PCs are your ticket to ride.

DELL DIMENSION XPS. PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

DELL™

TO ORDER, CALL

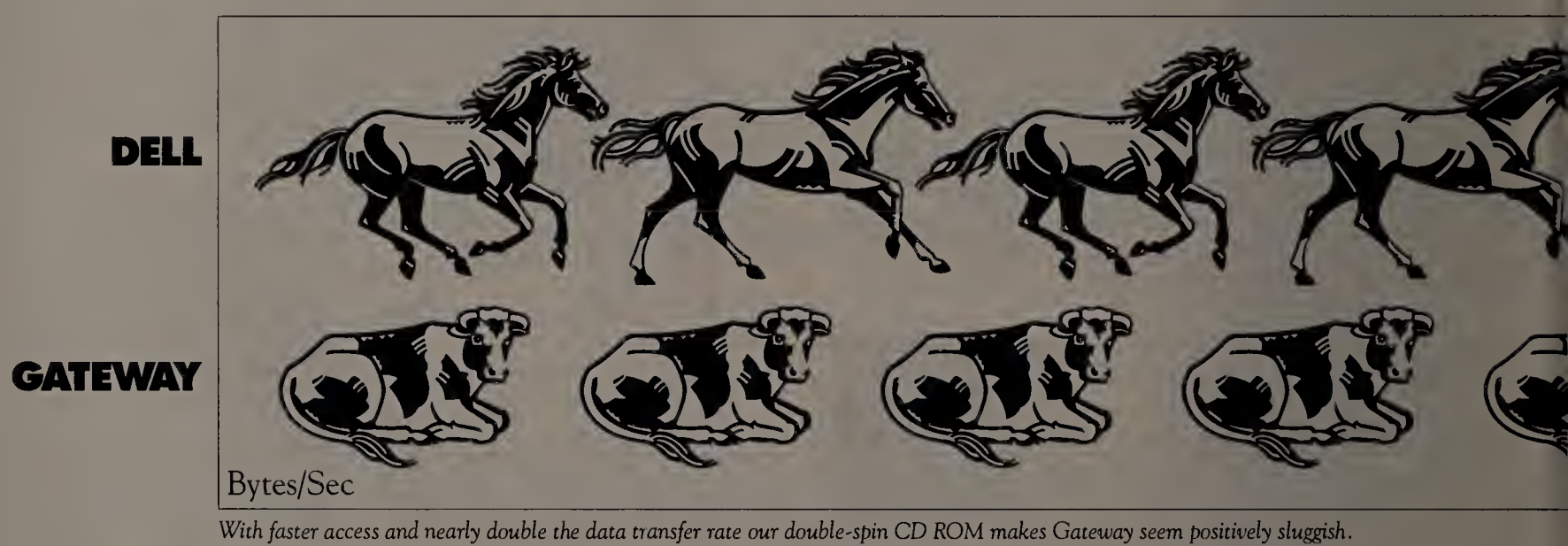
800-433-2392

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT

IN CANADA, CALL 800-668-3021. PLEASE REFERENCE **#11DBP**

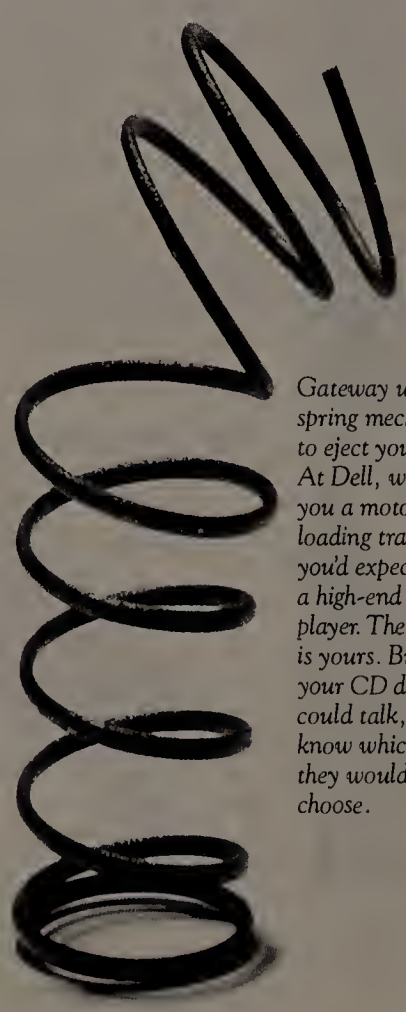
cache. VL-Bus is a trademark of Video Electronics Standards Association. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

FAST VS HALF-



With faster access and nearly double the data transfer rate our double-spin CD ROM makes Gateway seem positively sluggish.

Thanks to our multi-session CD technology, you can print to disk on as many as four different occasions, storing up to 100 color photographs in all.



Gateway uses a spring mechanism to eject your disks. At Dell, we give you a motorized loading tray like you'd expect from a high-end CD player. The choice is yours. But if your CD disks could talk, we know which one they would choose.

Whistle while you work. Or tap your foot. Or sing along. Our audio center CD ROM software lets you play disc jockey while you carry on with the important work of the day.

**All comparisons based on manufacturers' specifications. The Dell CD ROM is the Panasonic 563. Gateway's CD ROM is either a LMSI CM205 or a Sony CDU-31A. Dell disclaims proprietary interest in the marks and names of*

CDs FAST CDs.

When you buy a Dell Dimension™ XPS 450V or 466V equipped with a CD ROM, you get a CD ROM drive that runs circles around Gateway's*.

Our CD ROM drive gives you nearly twice the performance of Gateway's thanks to advanced double-spin technology that doubles the transfer rate and helps to speed up access time. In short, it's faster.

And that's just the start.

Our drive has the automatic, push-button motorized tray you'd expect to find on a high-end CD player. So your CD disks glide in and out effortlessly.

Gateway's has a manual spring-load reject, uh, eject button. It's still push-button, but your CDs don't glide effortlessly. In fact, they don't glide at all.

Ours is obviously a lot easier and more pleasant to use. And our CD ROM drive is built to last.

Our CD ROM is Kodak Photo-CD compatible. Which means you can take advantage of the latest in CD technology and view photographs on your PC screen.

What's more, our CD drive is multi-session. Which means you can print to the same CD on as many as four different occasions. Storing up to 100 pictures in all.

Our CD ROM also comes with software that lets you play your favorite tracks from any audio CD disk.

So you can listen to Mozart as you crunch numbers or bop along to the Beatles as you cruise your local BBS.

So if you want the best CD ROM technology for your money, make a fast decision and call Dell today.

After all, there's absolutely no reason why you should settle for a CD ROM that's behind the times.

DELL DIMENSION XPS. PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

DELL™

TO ORDER, CALL

800-545-6098

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT

IN CANADA, CALL 800-668-3021. PLEASE REFERENCE **#11DBQ**

others. ©1993 Dell Computer Corporation. All rights reserved.

PERFORMANCE MACHINES THAT BLOW THE GATES OFF GATEWAY.

DELL DIMENSION™ 486/33S
i486™ SX 33MHz SYSTEM

$1,499

- BUSINESS LEASE◊: $55/MO.
- 4MB RAM
- 64MB MAX RAM
- 170MB (17ms) HARD DRIVE
- UPGRADEABLE PROCESSOR
- 6 16-BIT ISA EXPANSION SLOTS AVAILABLE
- ACCELERATED LOCAL BUS VIDEO
- ULTRASCAN™ 14C MONITOR (14", 1024 x 768, .28mm, NI)
- DUAL DISKETTE DRIVES (3.5" AND 5.25")
- 101-KEY KEYBOARD
- MS-DOS® 6.0/MICROSOFT® WINDOWS™ 3.1/MOUSE

ALSO AVAILABLE IN 33MHz i486 DX FOR $1,999, BUSINESS LEASE: $74/MO. SYSTEM INCLUDES ABOVE, PLUS: 8MB RAM, 230MB (17ms) HARD DRIVE AND ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI).

DELL DIMENSION XPS 450V
i486 DX2 50MHz SYSTEM

$2,199

- BUSINESS LEASE: $81/MO.
- 8MB RAM
- 64MB MAX RAM
- 230MB (17ms) HARD DRIVE
- 128KB EXTERNAL CACHE
- UPGRADEABLE TO PENTIUM™ OVERDRIVE™
- 6 16-BIT ISA EXPANSION SLOTS AVAILABLE, 1 ON VL-BUS
- VL #9GXE VIDEO CARD
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE
- 101-KEY KEYBOARD
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

ALSO AVAILABLE IN 66MHz i486 DX2 FOR $2,599, BUSINESS LEASE: $96/MO. SYSTEM INCLUDES ABOVE, PLUS: 340MB (17ms) HARD DRIVE AND MULTI-SESSION, DOUBLE-SPIN CD ROM DRIVE.

DELL DIMENSION XPS 466V
MULTIMEDIA
i486 DX2 66MHz SYSTEM

$2,798

- BUSINESS LEASE: $103/MO.
- 8MB RAM
- 64MB MAX RAM
- 340MB (17ms) HARD DRIVE
- 128KB EXTERNAL CACHE
- UPGRADEABLE TO PENTIUM OVERDRIVE
- 5 16-BIT ISA EXPANSION SLOTS AVAILABLE, 1 ON VL-BUS
- VL DIAMOND VIPER VIDEO CARD
- 2MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE
- 101-KEY KEYBOARD
- MULTI-SESSION, DOUBLE-SPIN CD ROM DRIVE
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

ALSO AVAILABLE IN 66MHz i486 DX2 FOR $2,998, BUSINESS LEASE: $110/MO. SYSTEM INCLUDES ABOVE, PLUS: 450MB (12ms) IDE HARD DRIVE AND 256KB EXTERNAL CACHE.

DELL DIMENSION XPS. PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

Now that you have been a witness to the impressive technological superiority the Dell XPS PCs wield over Gateway's machines, there are only two small decisions you have left to make. And they're both easy ones:

Which Dell Dimension XPS PC is the right computer for you?

And what kind of software would you like to go with it?

That's right. You can order your software at the same time you order your Dell Dimension XPS. That way, you'll be up and running the minute you open the box and unpack your Dell XPS.

Purchase any combination from 100 of the most popular and competitively priced MS-DOS and Windows applications and have them pre-loaded onto your machine for one low $15 installation fee. Now that's a really good deal.

And should you ever feel the need to add a peripheral, upgrade a software package or order a new application, we're ready and able to help you there too. With DellWare.℠ A great selection of more than 2,400 software and peripheral items that you can order direct from us at discount prices. And if you want your DellWare selections in a real hurry, we'll ship your order to you overnight for only $5 extra. For no charge at all, we'll send you a free DellWare catalog.

Now if there's anything else we can do for you, just pick up the phone and call.

TO ORDER, CALL
800-626-4396

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA,* CALL 800-668-3021. PLEASE REFERENCE **#11DBR**

**Prices valid in the U.S. only. Some products and promotions not available in Canada. ◊Leasing arranged by Leasing Group, Inc. The Intel Inside logo is a registered trademark and i486, Pentium and Overdrive are trademarks of Intel Corporation. MS-DOS and Microsoft are registered trademarks and Windows is a trademark of Microsoft Corporation. Dell disclaims proprietary interest in the marks and names of others.* *©1993 Dell Computer Corporation. All rights reserved.*

FEATURES COMPARISON

Easy Backup Software Does It All for You

● Yes
○ No

	BEST BUY Central Point PC Tools 8.0	BEST BUY Central Point PC Tools for Windows 1.0	Gazelle Back-It 4 1.4	Gazelle Back-It for Windows 1.2	BEST BUY Symantec Norton Backup for DOS 2.2	BEST BUY Symantec Norton Backup for Windows 2.2	Sytron Sytos Plus 1.4
Standard features							
List price	$179.95	$179.95	$79	$79	$129	$149	$225
RAM required	640K	2MB	384K	2MB	512K	2MB	640K
Conventional RAM used	470K	60K	2K	1K	9K	0K	2K
Windows application	○	●	○	●	○	●	○
Network support	●	●	●	○	●	●	●
Multiple user levels	●	●	○	○	●	●	○
Mouse support	●	●	●	●	●	●	●
Data security							
Checks hard disk integrity	●	●	●	●	●	●	○
Checks for viruses	●	●	○	●	○	○	○
Restores from damaged disk	●	●	●[1]	●[1]	●	●	○
Compares backup with original	●	●	●	●	●	●	●
Warns before overwriting floppy disk or backup sets	●	●	●	●	●	●	●
Warns before overwriting newer file	●	●	●	●	●	●	●
Prevents other access to floppies during backup	●	●	○	○	●	●	○
Includes and excludes hidden files	●	●	○	○	●	●	●
Password protection	●	●	○	○	●	●	●
Encrypted backup	●	●	○	○	○	○	●
Backup features							
Select directories and files from tree display	●	●	○[2]	●	●	●	●
Select files by date range	●	●	●	●	●	●	●
File list shows size, date, time	●	●	○	●	●	●	●
View files before backup	●	●	○	●	●	●	○
Estimates backup time and size	●	●	○[3]	○[3]	●	●	○[3]
Selectable verify	●	●	●	●	●	●	○[4]
Restore features							
Restores files to different drive or directory	●	●	●	●	●	●	●
Restores to subdirectories under new file name	○	○	○	○	○	○	●
Select directories and files from tree display	●	●	●	○	●	●	●
Select files by date range	●	●	○	○	●	●	●
Compares backup to hard disk	●	●	●	●	●	●	●
Estimates restore time	○	○	○	○	●	●	○
Selectable verify	●	●	●	●	●	●	○
Tape drives supported							
QIC-40/80	●	●	●	●	●	●	●
Conner AccuTrak (Irwin Servo)	●	●	○	○	○	○	●
SCSI DC6000	●	●	●	●	○	○	●
SCSI DAT	●	●	●	●	○	○	●
Utilities							
Delete individual backup sets	○	○	○	○	●	●	●
Format	●	●	●	●	●	●	●
Format during backup	●	●	●	●	●	●	●
Quick erase	●	●	●	●	●	●	●
File exchange program	●	●	○	○	●	●	○

[1] Can't complete restore if a disk is missing. [2] Directories only. [3] Size only. [4] Compare only; requires separate step.

Tape: Safe, Easy, Cheap

Notice that list prices on these drives dip as low as $249. Depending on where you buy them, you can expect a further discount on most. All handle QIC-80 format, although the Mountain and Summit drives offer an alternative proprietary format that gives an even larger capacity. If you don't need portability and you have a free drive bay, buy an internal model. The external drives and portable models connecting to the parallel port cost a lot more.

Parallel-connected models are great if you have to back up more than one PC or a notebook. Many parallel-connected models won't work with the programs in our backup software review, but at least one publisher is planning future support. It always pays to query tape vendors to see if your favorite software is compatible with the drives you're interested in.

Minicartridge Tape Drives: Big Backups Come in Small Packages

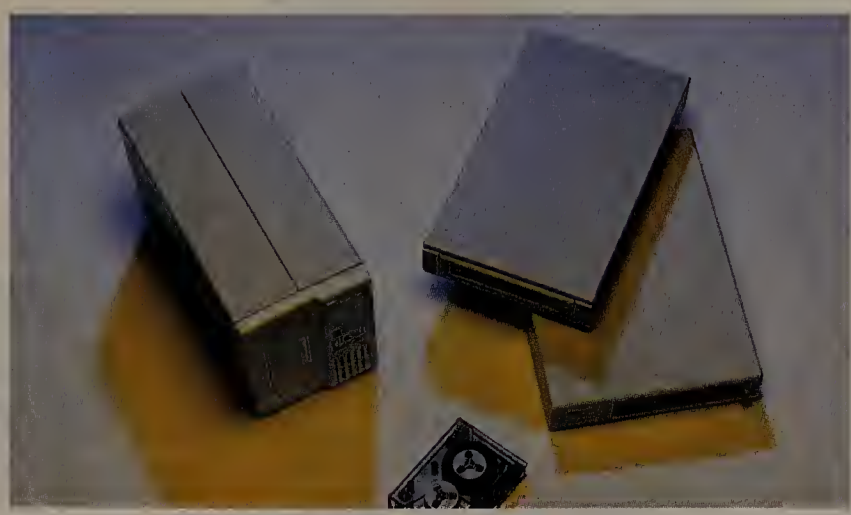
● = Yes ○ = No
n/a = not applicable

			KEY FEATURES			CAPACITY AND FORMATTING			
Company	Product	List price	Format	Type of unit	Warranty (months)	Formatted capacity (MB)	Estimated maximum capacity with compression (MB)[1]	Tape (media) included	Preformatted tape available
Alloy 800/800-2556	Retriever 250 Plus	$279[2]	QIC-80	internal	24	120	250	●	●
Colorado Memory Systems 800/451-4523	Jumbo 250	$279	QIC-80	internal	12	125	250	○	$32
	Jumbo 250 with KE-10 External Kit	$439	QIC-80	external	12	125	250	○	$32
	Jumbo Trakker 250	$548	QIC-80	parallel	12	125	250	○	$32
Conner Peripherals 407/263-3500	TapeStor-250MQ	$249	QIC-80	internal	12	124	250	●	$25[6]
	TapeStor-250MQP	$429	QIC-80	external	12	124	250	●	$25[6]
	TapeStor-250MQT	$259	QIC-80	internal	12	124	250	●	$25
	TapeStor-250MQPT	$449	QIC-80	external	12	124	250	●	$25[6]
Core Int'l 407/997-6055	CoreTape Light	$350	QIC-80	internal	18	120	300	●	$45[8]
	CoreTape Light-E	$610	QIC-80	external	18	120	300	●	$45[8]
Iomega 800/777-6179	Tape250 Insider	$269	QIC-80[9]	internal	24	120	250	●	$30
	Tape250 Half Height	$279[11]	QIC-80[9]	internal	24	120	250	●	$30
	Tape250 PC Powered	$429	QIC-80[9]	external	24	120	250	●	$30
	Tape250 Parallel Port	$548	QIC-80[9]	parallel	24	120	250	●	$30
Memorex Computer Supplies 408/957-1000	Memorex Tape Drive Backup System	$319	QIC-80[9]	internal	24	120	250	●	$30
Micro Solutions Computer Products 815/756-3411	Backpack Tape Drive	$489	QIC-80	parallel	24	120	250	●	$28
Mountain Network Solutions 800/458-0300	FileSafe TD-250	$315	QIC-80	internal	12	125	250	○	$30[13]
	FileSafe 8000Plus	$649	QIC-80[15]	internal	24	125[15]	250[15]	●	○
	FileSafe 8000Plus	$799	QIC-80[15]	external	24	125[15]	250[15]	●	○
	FileSafe 8500 IDE	$599	QIC-80[15]	internal	24	125[15]	250[15]	●	○
	FileSafe SideCar	$695	QIC-80[15]	parallel	12	125[15]	250[15]	○	○
SDI 800/872-7341	SDI 250P	$539	QIC-80	parallel	12	120	250	●	$25
Summit Memory Systems 408/438-2660	Summit SE250	$279	QIC-80	internal	24	125	250	○	$29
	Summit SE250 External	$378	QIC-80	external	24	125	250	○	$29
	Summit SE305 (IDE)	$359	QIC-80[15]	internal	24	125[15]	250[15]	○	$35
Tallgrass Technologies 800/825-4727	FileSecure FS250i	$345	QIC-80	internal	24	120	250	●	●
	FileSecure FS250e	$545	QIC-80	external	24	120	250	●	●
Tecmar 800/422-2587	MiniVault 250	$519	QIC-80	internal	24	120	250	●	$45[17]
	MiniVault 250E	$639	QIC-80	external	24	120	250	●	$45[17]
Wangtek 800/992-9916	3080PK	$325	QIC-80	internal	12	120	250	●	●
	E3080PK	$495	QIC-80	external	12	120	250	●	●

[1] Actual capacity varies with file compressibility.
[2] $259 without backup software.
[3] Included.
[4] 1-mbps high-speed controller with hardware compression.
[5] At 6 percent duty cycle.
[6] $50 for a package of two.
[7] At 5 percent duty cycle.
[8] $225 for a package of five.
[9] Can read QIC-40/80 and write QIC-80.
[10] DOS and Windows versions included.
[11] Application and pricing available at the end of 1993.
[12] Includes adapter rails to fit a 1/2-height 5 1/4-inch bay.

While the software that's bundled with tape drives has no great reputation for usability, some vendors are working on new programs with improved features. And Conner should have its own stand-alone package on the market by the time you read this. As you scan the software that comes with the drives, you'll notice Best Buy packages bundled with some of the most affordable. That's a tough combination to beat.

—Rex Farrance



RON MILLER

EXTERNAL TAPE DRIVES COME IN TWO FLAVORS: Standard models and the more easily portable parallel-port units.

CONTROLLERS, CONNECTIONS, AND LONGEVITY								BUNDLED SOFTWARE		
Works with floppy controller	Standard floppy controller or adapter available from manufacturer	1-mbps high-speed controller	Other high-speed controller	Micro Channel adapter	3½-inch drive	Fits 1-inch-high drive bays	Mean time between failures (thousands of powered-on hours)	Software provided	Windows applications	Reader service number
●	○	○	○	○	○	○	25	Gazelle Back-It for DOS and Windows	●[3]	684
●	●[3]	$129	$229[4]	$299	●	○	40[5]	Colorado Backup for DOS	$59	685
●	●[3]	$129	$229[4]	$299	n/a	n/a	40[5]	Colorado Backup for DOS	$59	685
n/a	n/a	n/a	n/a	n/a	n/a	n/a	40[5]	Colorado Backup for DOS	$59	685
●	$99	$129	○	○	●	●	60[7]	Backup Basics: Simply Safe Backup	●[3]	686
n/a	n/a	n/a	n/a	n/a	n/a	n/a	60[7]	Backup Basics: Simply Safe Backup	○	686
●	$99	$129	○	○	●	●	60[7]	Backup Basics: Simply Safe Backup	●[3]	686
n/a	n/a	n/a	n/a	n/a	n/a	n/a	60[7]	Backup Basics: Simply Safe Backup	○	686
●	●[3]	○	○	$109	●	○	25	CoreTape	○	687
●	●[3]	○	○	$109	n/a	n/a	25	CoreTape	○	687
●	●[3]	$150	○	○	●	●	30	Central Point Backup[10]	●[3]	688
●	●[3]	$150	○	○	●[12]	●[12]	30	Central Point Backup[10]	●[3]	688
●	●[3]	$150	○	○	n/a	n/a	30	Central Point Backup[10]	●[3]	688
n/a	n/a	n/a	n/a	n/a	n/a	n/a	30	Central Point Backup[10]	●[3]	688
●	○	$159	○	○	●[12]	●[12]	30	Norton Backup 2.2[10]	●[3]	689
n/a	n/a	●[3]	n/a	n/a	●	●	60[7]	BPBackup	○	690
●	○	○	○	○	○	○	30[14]	FileSafe	○	691
○	○	○	$154[4]	$239	○	○	30[14]	FileSafe	○	691
○	○	○	$164[4]	$239	n/a	n/a	30[14]	FileSafe	○	691
○	n/a	n/a[16]	●[3]	○	○	○	30[14]	FileSafe	○	691
n/a	n/a	n/a	n/a	n/a	n/a	n/a	30[14]	FileSafe	○	691
n/a	n/a	n/a	n/a	n/a	n/a	n/a	30	Gazelle Back-It or Central Point Backup[10]	●[3]	692
●	●[3]	$130	○	$250	●	○	30[14]	Central Point Backup[10]	●[3]	693
●	●[3]	$130	○	$250	●	○	30[14]	Central Point Backup[10]	●[3]	693
○	○	n/a[16]	n/a	○	●	○	30[14]	SummitSafe	●[3]	693
●	○	○	○	○	●	○	40	FileSecure	$140	694
●	○	○	○	○	n/a	n/a	40	FileSecure	$140	694
●	○	$195	○	$249	●	○	24[18]	MiniVault Software	○	695
●	○	$195	○	$249	n/a	n/a	24[18]	MiniVault Software	○	695
●	○	$195	○	○	●	○	40	Central Point Backup[10]	●[3]	696
●	○	$195	○	○	n/a	n/a	40	Central Point Backup[10]	●[3]	696

[13] $60 for a package of two.

[14] At 25 percent duty cycle.

[15] Has alternative format with 152MB native compressed capacity. Special format not QIC-80 compatible.

[16] IDE adapter. IDE controller supports 1-mbps transfers.

[17] Sold in packages of five for $225 or two for $99.

[18] At 15 percent duty cycle.

For more information about all products in this table, circle reader service no. 903.

Even a *free* memory manager may not be a bargain—especially if it can't give you all the memory you need.

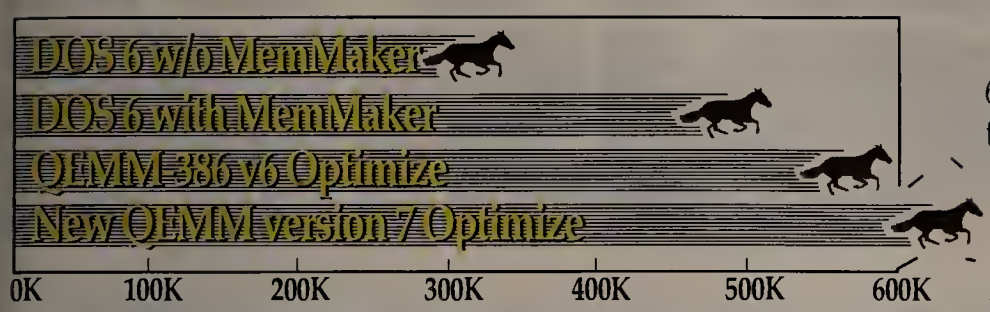
Introducing QEMM 7
The Memory Manager Worth Paying For

The newest version of the Quarterdeck Expanded Memory Manager (QEMM), version 7, once again is extremely innovative in using the critical area between 640K and 1024K. It finds space for more TSRs and drivers in this area than anyone thought possible. It optimizes this area, taking into account the many drivers that need more memory at start-up than when running; instantly calculating millions of possible memory configurations to find still more memory for your programs to use. And it treats the rest of memory as a giant pool to instantly fulfill the needs of all of your programs—whether they use extended or expanded memory. Whether your PC has 1 megabyte or 16, you can benefit from new QEMM 7.

Instant Riches

What does more memory mean in a practical sense? It means that your DOS and MS Windows programs run faster, smoother and more reliably. It means you can continue to add valuable utilities, drivers, TSRs and new capabilities to your PC. Whether it's workhorse drivers like LAN utilities and fax drivers; productivity-enhancers like disk caches and disk compressors; or fun and exciting capabilities like sound boards, CD ROM drivers, graphics tablets, etc. The better your memory is managed, the more versatility and flexibility your PC has. QEMM 7 lets you have it all without fear of 'out of memory' messages or crashes.

How to Look a Gift Horse in the Mouth



We tested DOS 6 with and without MemMaker and with QEMM 6 and our new QEMM 7 runs away from all of them. See details of test conditions listed below.

DOS 6 Giveth; DOS 6 Taketh Away

The best feature of new DOS 6 is the stable of utilities it includes. Trouble is, they all eat up memory. DoubleSpace file compression needs 43K, Vsafe anti-virus needs 7-45K, Smartdrv disk cache needs 28K and even Undelete takes 10-14K as a resident program. Using Microsoft's free memory utility, MemMaker, you could easily end up with a net loss of available 'conventional' memory in DOS 6.

New QEMM 7 takes the best of the new DOS 6 features into account, finding ways to give you more free memory for your program while taking full advantage of DOS 6. One new QEMM 7 feature, DOS-Up, moves the DOS 6 kernel, its data and resources to memory above 640K (this feature also works with DOS 3-5), freeing 7-70K. Another new QEMM 7 feature, Stealth DoubleSpace, frees 40K of the memory addresses used by DoubleSpace and makes them available for other drivers and TSRs. Both features ensure that the all-important memory below 640K is free for your programs. And QEMM 7's seemingly small feature of supporting multiple configurations gives you the flexibility and ease of setup that you expect. (MemMaker doesn't work well with this important DOS 6 feature.) That's why it makes more sense than ever to put your money on the best memory manager.

Prior versions of QEMM won just about every competition in sight, as well as remaining the #1 best-selling memory manager 5 years straight.

Page Frame: the Key to Your Future

There's been a lot of talk about our patent-pending Stealth technology. Jealous talk, mostly. Because nobody else can touch its performance. Our Stealth ROM feature, pioneered in QEMM 6, frees 48-115K of ROM addresses for use by TSRs and drivers. Our Stealth DoubleSpace feature, described above, frees another 40K. And as you might imagine, there's more to come.

The key to Stealth is its use of a 64K reserved area above 640K called the page frame. Besides being used by Stealth, the page frame is used by Lotus 1-2-3 r2.x for larger spreadsheets and WordPerfect 5.x for larger documents, DESQview for multitasking, Novell Netware, IBM LAN Server and DECnet for reducing the network driver memory footprint, plus games like Wing Commander, Car and Driver, Ultima Underworld II, Wolfenstein and others for fast action. You sacrifice all this when you turn off the page frame (which other memory managers do to maximize available memory above 640K). It's this use of the page frame by Stealth that lets you set up your PC with a mouse, CD ROM, sound board, a network such as Novell NetWare, reserve 8-24K of extra memory for optimal MS Windows performance, use all of DOS 6's memory-hungry utilities and still have more than 630K available for your programs. (Compared to DOS 6's 527K available in the same configuration, after using MemMaker).

There's lots more to QEMM 7:

- Tuned for MS Windows
- New ability to use Vidram inside MS Windows
- DPMI Host
- Pentium Support
- Laptop suspend/resume support
- PS/2 micro channel adapters
- Compaq support
- Fine tuning tools for power users
- 32-bit architecture for speed
- Enhanced compatibility in response to hardware needs of our millions of users:
  - Detects adapter RAM and ROM and bus-mastering hard drive controllers
  - Monitors DMA access into memory
  - Supports Shadow RAM

Easier to use for Novices, More Power for Experts; More Memory for All

Our seventh-generation thoroughbred QEMM has improved ease-of-use, with Express Install and Help features. And for power users, Advanced Install and editable parameters and troubleshooting hints.

And QEMM 7 comes with Manifest, the award-winning memory analyzer—enhanced for more flexibility with Pentium testing, laptop battery reporting, network analysis and editable configuration files.

The new and ever more exciting capabilities coming to your PC will all compete for memory with your favorite applications, TSRs and drivers. And that makes QEMM 7 the front runner in your efforts to get get the best performance out of your PC today—and tomorrow.

Quarterdeck

Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405 (310) 392-9851 Fax (310) 314-4219
Quarterdeck International Ltd., B.I.M. House, Crofton Terrace, Dun Laoghaire Co. Dublin, Ireland Tel. (353) (1) 284-1444 Fax: (353) (1) 284-4380

QEMM Users: upgrades are available from dealers.

You can also buy direct from Quarterdeck. Call (800) 354-3222 ext. 1D7 and ask about our special Game Pack offer with your upgrade!

How we got the chart numbers CPU—486/33 ALR Power/business VEISA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=10, STACKS=0,0, MVSOUND.SYS, SNDBK12.SYS, SLCD.SYS, DOS SHELL=statement in the AUTOEXEC.BAT file: VSAFE, MSCDEX, UNDELETE, LSL.COM, NE2000.COM, IPXODI.COM, NETX OR EMSNETX, MOUSE.COM, SMARTDRV.COM, PRTSCCAP.COM.

©1993 Quarterdeck Office Systems. Trademarks are property of their respective owners.

Circle 189 on reader service card

DON'T BE EXPENSIVE

DELL® 425s/L
i486™ SX 25MHz SYSTEM

$1,499

- Business Lease◊: $55/MO.
- 4MB RAM
- 120MB (17ms) Hard Drive
- 3 ISA Expansion Slots
- Upgradeable to Pentium™ Technology
- Accelerated Local Bus Video
- SVGA 1024I Monitor (14", 1024 x 768, .28mm)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS® 6.0/Microsoft® Windows™ 3.1/ Mouse
- High Performance Windows Drivers
- Embedded System Diagnostics

DELL 433/L
i486 DX 33MHz SYSTEM

$1,999

- Business Lease: $74/MO.
- 4MB RAM
- 170MB (17ms) Hard Drive
- 3 ISA Expansion Slots
- Upgradeable to Pentium Technology
- Accelerated Local Bus Video
- UltraScan 14C Monitor (14", 1024 x 768, .28mm, NI)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS 6.0/Microsoft Windows 3.1/ Mouse
- High Performance Windows Drivers
- Embedded System Diagnostics

DELL 450/M
i486 DX2 50MHz SYSTEM

$2,899

- Business Lease: $107/MO.
- 8MB RAM
- 320MB (17ms) Hard Drive
- 6 ISA Expansion Slots
- Upgradeable to Pentium Technology
- Accelerated Local Bus Video with 1MB Video RAM
- UltraScan 15FS Monitor (15", 1024 x 768, .28mm, NI)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS 6.0/Microsoft Windows 3.1/ Mouse
- High Performance Windows Drivers
- Embedded System Diagnostics

DELL 433s/L
i486 SX 33MHz SYSTEM

$1,799

- Business Lease: $67/MO.
- 4MB RAM
- 170MB (17ms) Hard Drive
- 3 ISA Expansion Slots
- Upgradeable to Pentium Technology
- Accelerated Local Bus Video
- UltraScan™ 14C Monitor (14", 1024 x 768, .28mm, NI)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS 6.0/Microsoft Windows 3.1/ Mouse
- High Performance Windows Drivers
- Embedded System Diagnostics

DELL MULTIMEDIA 450/L
i486 DX2 50MHz SYSTEM

$2,498

- Business Lease: $92/MO.
- 4MB RAM
- 230MB (17ms) Hard Drive
- Upgradeable to Pentium Technology
- Accelerated Local Bus Video
- UltraScan 14C Monitor (14", 1024 x 768, .28mm, NI)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS 6.0/Microsoft Windows 3.1/ Mouse
- ▸ **Internal CD ROM**
- High Performance Windows Drivers
- Embedded System Diagnostics

DELL 466/M
i486 DX2 66MHz SYSTEM

$3,199

- Business Lease: $118/MO.
- 8MB RAM
- 450MB (12ms) Hard Drive
- Upgradeable to Pentium Technology
- Accelerated Local Bus Video with 1MB Video RAM
- UltraScan 15FS Monitor (15", 1024 x 768, .28mm, NI)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS 6.0/Microsoft Windows 3.1/ Mouse
- High Performance Windows Drivers
- Embedded System Diagnostics

**Guarantees available in USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax℠ line at 1-800-950-1329 or products and promotions not available in Canada or Mexico. ◊Leasing arranged by Leasing Group, Inc. MS-DOS and Microsoft are registered trademarks and Windows is a trademark of Microsoft Corporation the marks and names of others.* *©1993 Dell Computer Corporation. All rights reserved.*

FOOLED BY IMITATIONS.

DELL 450/ME
i486 DX2 50MHz SYSTEM

$3,499

- Business Lease: $129/MO.
- 8MB RAM • 450MB (12ms) HD
- 128KB SRAM Cache
- 4 EISA/2 ISA Expansion Slots
- Upgradeable to Pentium Technology
- Accelerated Local Bus Video with 1MB Video RAM
- UltraScan 15FS Monitor (15", 1024 x 768, .28mm, NI)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS 6.0/MicrosoftWindows 3.1/ Mouse
- High Performance Windows Drivers
- Embedded System Diagnostics

DELL 466/ME
i486 DX2 66MHz SYSTEM

$3,849

- Business Lease: $139/MO.
- 16MB RAM • 450MB (12ms) HD
- 128KB SRAM Cache
- 4 EISA/2 ISA Expansion Slots
- Upgradeable to Pentium Technology
- Accelerated Local Bus Video with 1MB Video RAM
- UltraScan 15FS Monitor (15", 1024 x 768, .28mm, NI)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS 6.0/Microsoft Windows 3.1/ Mouse
- High Performance Windows Drivers
- Embedded System Diagnostics

DELL 433/T
i486 DX 33MHz SYSTEM

$2,999

- Business Lease: $111/MO.
- 8MB RAM • 450MB (12ms) HD
- 128KB SRAM Cache
- 8 ISA Expansion Slots
- Upgradeable to Pentium Technology
- Accelerated Local Bus Video with 1MB Video RAM
- UltraScan 15FS Monitor (15", 1024 x 768, .28mm, NI)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS 6.0/Microsoft Windows 3.1/ Mouse
- High Performance Windows Drivers
- Embedded System Diagnostics

DELL 466/T
i486 DX2 66MHz SYSTEM

$3,399

- Business Lease: $126/MO.
- 8MB RAM • 450MB (12ms) HD
- 128KB SRAM Cache
- 8 ISA Expansion Slots
- Upgradeable to Pentium Technology
- Accelerated Local Bus Video with 1MB Video RAM
- UltraScan 15FS Monitor (15", 1024 x 768, .28mm, NI)
- One Diskette Drive (3.5" or 5.25")
- MS-DOS 6.0/Microsoft Windows 3.1/ Mouse
- High Performance Windows Drivers
- Embedded System Diagnostics

Here are just a few of the latest and greatest Dell systems. By the time we're done custom configuring, you could have quite a few more affordable options ... 9,990 to be precise.

But we don't stop at great systems and great choices at great prices. We also give you some of the greatest service and support in the industry. If you ever need support you can call us 24 hours a day, seven days a week. If needed, we'll send a trained technician the next business day, guaranteed.* And with Dell ReadyWare,℠ you can choose from a selection of over 100 different applications which can be pre-loaded for one small $15 installation fee. Saving you time, energy and aggravation. Not to mention money.

intel inside®

Now let's talk accessories. No matter what else you want with your system, you can probably get it through Dell. In fact, you can order over 2,400 items from our free DellWare℠ catalog.

Just one toll-free call is all it takes to get these systems and practically all the other computer options you could need. None of those expensive companies can even come close to imitating that.

DELL™

TO ORDER, CALL

800-247-2076

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA,* CALL 800-668-3021. IN MEXICO CITY,* 228-7811. #11DBS

*rite Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. Attention Guarantees.*Prices valid in the U.S. only. Some*
he Intel Inside logo is a registered trademark and i486 and Pentium are trademarks of Intel Corporation. Dell disclaims proprietary interest in

Windows DTP Comes of Age

Coupling ease of use with new type and color capabilities, Windows desktop publishing programs pick up where word processors leave off. We choose the best of the four front-runners. BY WILLIAM HARREL

To most people, desktop publishing (DTP) means Macintoshes running QuarkXPress or PageMaker. Desktop publishing is so entrenched on the Macintosh platform, in fact, that we desktop publishers who have hung in there with Windows are looked down upon by our Macintosh counterparts (whom we lovingly refer to as Mac snobs).

Let's face it. Until this year Macintosh users had good reason to be smug. Historically, desktop publishing has been more advanced on the Mac. This year two significant events—the releases of QuarkXPress for Windows and PageMaker 5.0—should level the playing field. Both programs support process-color separations and have excellent typography controls. The sheer size of the PC market is inspiring the move to Windows of graphics, font, video, display, and printer technology from companies like Adobe Systems, Super-Mac Technology, Radius, and Aldus.

A final touch is the release of Adobe Photoshop for Windows. While Windows image editing software abounds, most DTP professionals use Photoshop, which confined desktop photo touch-up, an important capability, to the Mac.

Windows users who held out have finally been rewarded. The desktop publishing field is now wide open. PC hardware is cheaper, and since PCs account for a huge majority of the world's computers, PC users also have the compatibility edge.

Until last year you had two main choices for full-featured Windows desktop publishing packages: Aldus's PageMaker or Ventura Software's Ventura Publisher. Computer pundits and desktop publishers argued over which program was better. Invariably, the consensus has been that PageMaker works best for short documents, such as fliers, brochures, and newsletters, while Ven-

JEFF KOEGEL

tura excels at long documents, such as books, catalogs, and directories.

Choosing a full-featured desktop publishing package is no longer an either-or proposition. Frame Technology's FrameMaker, a UNIX native, entered the DTP race last year. Its long-document prowess is giving Ventura a strong run for the money. And finally, this year's long-awaited release of QuarkXPress promises to threaten PageMaker's lengthy reign on the PC as the favored, design-intensive page layout package for short documents. Superb color capabilities and typography controls have made QuarkXPress for the Mac the pick among publishers of high-quality four-color documents. With plenty of notice, Aldus has fired back with PageMaker 5.0. PageMaker's new four-color support and improved font handling should keep it in the running and contribute greatly to Windows finally becoming a viable full-color publishing alternative to the Mac.

The Long and Short of It

So, what separates a long-document page layout program from one that works well for short documents? At first glimpse, the line seems fuzzy. But it's not, really. Most writers and publishers create longer works—books, manuals, and so on—in sections, made from separate computer files. Shorter works—brochures, newsletters, fliers—are usually contained in one file. Software proficient at laying out long documents should help you manage all the files that comprise your book or manual, and short-document software should provide flexible tools for placing and manipulating text and graphics on individual pages.

There are long documents, and then there are long documents. The distinction is in how they're laid out. Newsletters can be long, but most publishers don't lay them out in sections (or chapters) with each section a separate file. Books, some proposals, catalogs, and product documentation, on the other hand, are generally laid out a section at a time and then compiled into one large work.

To compile a long document, the page layout software must first combine several chapters and treat them as one continuous book, repaginating them in sequential sections. Long-document layout software should also provide a convenient way to generate tables of contents, indexes, and other lists that include data from all the sections in the work. Ventura, FrameMaker, and PageMaker all let you perform these tasks; QuarkXPress does not.

Again, not all long documents are created equal. Some, for example, have numbered figures and tables throughout each chapter. During layout the placement and numbering of these elements can change drastically. A truly proficient long-document DTP package should let you update figure and table numbering automatically, rather than force you to open each chapter and renumber them manually. Ventura and FrameMaker leave PageMaker in the dust

Framing the Future

Like almost every other software category, desktop publishing is ever-changing. The upgrade path for our four contenders is clear for only one product, FrameMaker.

The big news on the horizon is FrameMaker 4.0. The current version didn't fare too well in our tests. It fell short on the full-color document because it can't separate process color. In our newsletter it could not create irregular text wraps or automatic drop caps. And the program strays enough from Windows conventions that it's hard to use.

Version 4.0 of FrameMaker addresses most of these shortcomings and brings a wealth of new features to the Windows desktop publishing arena. The best news is that the confusing dialog boxes and other conventions have been revamped to make the program much easier to learn and use.

At press time Frame Technology wasn't sure whether FrameMaker 4.0 would support CMYK TIFFs, but it will separate color EPS files and colors created within FrameMaker itself. The program will also separate EPS files containing PMS colors and will have a built-in PMS color palette.

FrameMaker 4.0 will also contain several hypertext functions, such as links that take you from an index or table of contents entry to its reference—even if the document file containing the reference is closed. One of the exciting new features in FrameMaker 4.0 is Compare, which looks at two similar documents and marks them to show you how they differ. Not only that, a summary document lists the changes and lets you jump to every change directly in both documents using hypertext. This capability is nearly perfect for handling simultaneous editing.

> Where FrameMaker stands head and shoulders above other desktop publishing packages is online publishing.

Where FrameMaker stands head and shoulders above other desktop publishing packages is online publishing. Used in conjunction with FrameReader, virtually any document you create in FrameMaker can be used as an interactive reference. You can, for example, create hot links between graphics and text that jump readers to other parts of documents. The benefit of using FrameMaker to generate interactive documents is that you can also publish them on paper.

A couple of features that would have helped FrameMaker fare better on our tests will still be missing, however. FrameMaker 4.0 will not support irregular text wraps and drop caps. Also, the process-color separation portion of the program we saw in the prerelease evaluation copy was perfunctory. It doesn't let you set halftone screen frequencies and angles, for example. Nor can you perform other often-necessary tasks, such as under-color removal on separations.

According to Frame Technology, FrameMaker 4.0 is not really intended for high-end process-color publishing. Frame threw in the color support in case you need it now and then. Professional desktop publishers don't often agree on the best way to lay out documents, but they would probably all want a fully developed process-color separation engine rather than part of one.

Still, FrameMaker 4.0 is a vast improvement over version 3.0 and a strong, viable alternative to Ventura Publisher.

here. You have to make these updates by hand in PageMaker—and these are the kinds of edits that are easy to miss or forget.

Variables are yet another necessity for long documents, such as catalogs, proposals, and directories, in which data changes often and requires updating. *Variables* allow you to place markers in text and change data globally with a few mouse clicks, sparing you from doing search-and-replace routines in each section. Again, only FrameMaker and Ventura have this power.

Short documents—fliers, posters, brochures, and newsletters—are usually more design-intensive than books. The emphasis is on placing, moving, arranging, and resizing objects. In a package strong in short-document layout, it should be easy, for example, to rotate text and graphics, to crop photographs, and even to move elements off the page (onto a "pasteboard") to get them out of the way while you experiment with your layout. QuarkXPress and PageMaker both handle these tasks with ease. Ventura and FrameMaker can do most of these tasks in one way or another, but not nearly as well. Since short documents, particularly brochures and circulars, are often colorful, a program good at creating them should also provide much more flexibility in preparing color documents for reproduction at the print shop. QuarkXPress and PageMaker excel here, with QuarkXPress having a very slight edge.

Sizing Up the Competition

To please the picky publishing professional, any DTP program will have to master the widest range of basic documents. We created three real-world business marketing documents to test each program—a newsletter; a short, four-color brochure; and a multisection technical proposal—for a fictitious communications company named IntelliFone. Each document emphasizes different aspects of page layout: design, full color, or long-document handling.

The bottom line: If you work at it, you can cajole any of the four programs here to produce all three test documents. However, none of the programs worked ideally for all three layouts. For example, we could have forced irregular text wraps in the newsletter a line at a time in the two programs that don't support them (Ventura and FrameMaker), but we'd have spent all day doing it.

Read on for the results of our experiences laying out the three test documents. In many ways, the desktop publishing programs performed as we predicted they would, with PageMaker and QuarkXPress excelling on the newsletter and brochure and Ventura and FrameMaker acing the proposal. But there were also some surprises.

The newsletter is design-intensive. It consists of several tricky elements, such as irregular text wraps around odd-shaped graphics, stories that jump to nonsequential pages, halftone art, rotated text and graphics, and spot-color separations.

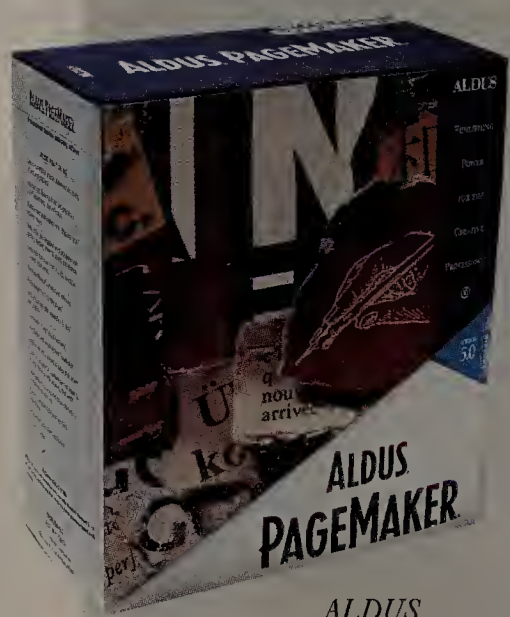
The brochure is a simple trifold mailer. What's not simple is that it's four-color. To print your full-color, or *process-color*, documents, most print shops require you to "separate" the pages into four plates, one for each color ink used by the offset press—cyan, magenta, yellow, and black (CMYK). The printing press layers the four colors over one another in percentages, or halftone screens, to reproduce photographs and other color elements.

The proposal is designed to test each program's long-document features. It contains several figures (charts and graphs) and tables that require renumbering after the document is compiled, and we generated a table of contents and an index with each new proposal.

Best Buy

Publishing a document like the Spiegel Catalog is very different from turning out the company newsletter every month. And while a desktop publishing program makes either task much easier, the features needed are dramatically different. While the best single program for laying out a variety of long and short documents is PageMaker, its color handling options aren't quite as thorough as those in QuarkXPress, and its long-document features don't match Ventura Publisher's or FrameMaker's. Nevertheless, both its book and color features for long documents are respectable. It also manages the trek to the Macintosh platform with grace and ease.

Since no program can do everything you need it to, consider whether you are prepared to learn and use more than one program to meet all your needs. To get a beautiful and rich set of color features and do careful design work with high-end process-color separations, you may want to turn to QuarkXPress instead of PageMaker if you don't often work with long documents.



ALDUS PAGEMAKER 5.0: We found it to be the best all-around buy in desktop publishing.

Long on Labor

Long documents are a slightly different story. You should seriously consider Ventura Publisher over PageMaker for these labor-intensive projects. You should also turn to FrameMaker if you want to add cross-platform features to long-document strength or if you plan to generate electronic, online documents as often as you produce paper ones.

If you're looking for the best deal, check out Ventura Software's Publisher's PowerPack. For $995 ($200 more than Ventura Publisher), you get Ventura Publisher; AdPro, a dedicated display-ad layout program; PicturePro, a full-fledged image editing package; and Ventura Database Publisher, a tool to ease the creation of documents generated from databases of information, such as catalogs.

A new program we weren't able to include in our review, PagePlus for Windows from Serif Incorporated, has most of the features of QuarkXPress and PageMaker, but without long-document handling. It includes real color separations for an incredible $59.95 (that is not a misprint). PagePlus might provide a valuable alternative for the desktop publisher who either doesn't need the robustness of the major packages or wants to add color capabilities cheaply to FrameMaker or even Ventura.

Task 1: The TeleFocus Newsletter

Newsletter publishing may seem straightforward, but it can be as complicated as you choose to make it. Our newsletter, *TeleFocus*, put these packages to the test. To perform well the programs had to let us create and use a number of fairly sophisticated paragraph styles, jump and link text on nonsequential pages, create drop caps, wrap text around several odd-shaped graphics, and print spot-color separations.

All programs set up the three-column page, created style sheets, and formatted text quite nimbly. The only problems came from FrameMaker, which does not support multiple columns in frames. On the front page, for example, we had to create six separate frames to accommodate our two stories. In general, we found FrameMaker difficult to master. Its procedures and terminology stray far enough from standard Windows conventions that we spent much too much time with our heads buried in the manual—sometimes to no avail.

PageMaker, Ventura, and QuarkXPress all have drop cap features, which made starting each new story with an enlarged first character a snap. In FrameMaker we had to create a new frame for the character and wrap body text around it. All but QuarkXPress have a column balance feature, which lines up text at the top and bottom of contiguous columns. To align our columns in QuarkXPress we had to experiment with increasing and decreasing the space between subheads and body text—a time-consuming, trial-and-error process.

Some of the stories in *TeleFocus* include headlines that span several columns. To achieve this effect, usually you must cut the headline away from the story and place it as a separate object. Ventura gets around this by letting you set a single paragraph's width to the width of the frame in the Alignment dialog box, which saves a lot of fuss and keeps the headline attached to the story it introduces.

One of the trickier layout requirements in *TeleFocus* is flowing, or *jumping*, stories to nonsequential pages. While all four programs were able to jump the stories easily enough, PageMaker and FrameMaker do not provide a way to generate jumpline references ("Continued on page 3") automatically. Whenever you insert or delete a page or move a story, you must remember to go back and manually update your jumplines.

Graphics Placement and Formatting

The *TeleFocus* layout has several graphics—gray-scale scanned photographs, a couple of monotone TIFFs, and a few EPS graphics. One of the EPS graphics, the IntelliFone logo, contains a spot color, Pantone Reflex Blue. Pantone Matching System (PMS) is the spot-color ink matching system used by most print shops. We also used Reflex Blue throughout the newsletter on rules (lines) in the headers and footers and for background shading in the table of contents and a few sidebars.

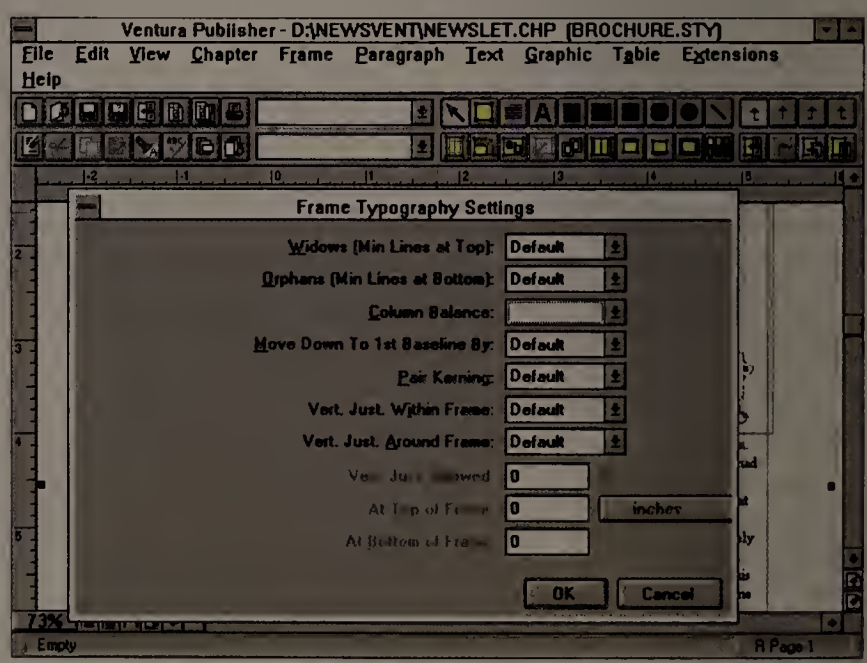
All four products support spot-color separations, but FrameMaker cannot separate imported graphics. Ventura, on the other hand, not only separates imported spot-color EPS files, but also assigns the spot colors in them to a document's color palette automatically. After importing the IntelliFone logo into our newsletter, assigning Reflex Blue to the other colored elements of our layout was a snap. The real benefit of this feature, though, comes when you don't know the name or PMS number of the spot color in the EPS file. Ventura makes the match for you.

All four of the products support spot-color separations, but FrameMaker can't separate imported graphics.

Ventura and PageMaker excelled at placing our scanned images. Both programs support scanning directly into a layout. PageMaker uses the industry-standard TWAIN interface, and Ventura ships with an extension, Ventura Scan. To bring scanned images into the other two programs, you must scan them into your image editing program and import them.

After importing our images, we wanted to contour text around a few of them. When it came to this task, QuarkXPress and PageMaker handily bested the other two. Neither FrameMaker nor Ventura supports irregular text wrap (a plug-in is available for Ventura, but it isn't part of the basic package). QuarkXPress and PageMaker wrap text quite adroitly (and almost identically), and they provide extensive control over the wrap, allowing you to adjust its contour and distance from the graphic as desired.

The newsletter we designed for this layout was complex. All four of the packages could produce a simple newsletter easily, so you should match your needs to the capabilities of different packages.



COLUMN BALANCE ADJUSTS THE LINE SPACING IN TEXT to force text at the tops and bottoms of columns to line up. Ventura, PageMaker, and FrameMaker have similar features.

No wonder everyone is moving to

Austin.

It's so green here!

Austin, the city, and Austin Computer Systems, the company, both actively promote a clean, healthy environment.

MICROSOFT. WINDOWS. READY-TO-RUN

intel inside

The affordable, powerful 486 Green PCs from Austin Computer Systems exceed EPA Energy Star conservation guidelines, powering down to just 24 watts — including the monitor — in idle mode.

CALL FOR INFORMATION OR OTHER CONFIGURATIONS 1-800-331-1501

Austin has it all!

TOWN LAKE HIKE & BIKE TRAIL

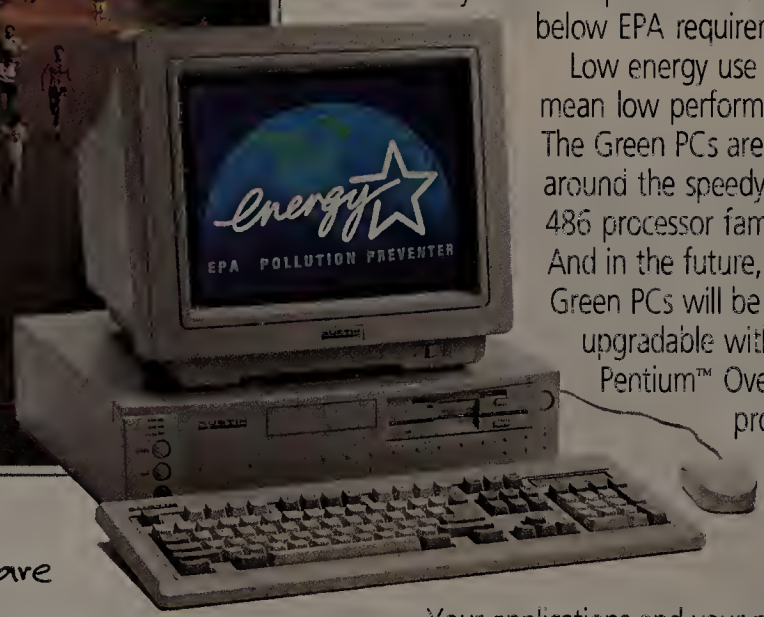
486 Green PCs

Save energy. Save money. On a complete "green" PC solution.

Austin Computer Systems offers the first complete Energy Star system—*including* the monitor—starting at $1,549. When idle, these PCs use just 24 watts of electricity, exceeding EPA energy conservation guidelines!

Unlike competing systems, the 486 Green PCs work with standard monitors. Our systems' power management circuit reduces any monitor's power consumption below EPA requirements.

Low energy use doesn't mean low performance. The Green PCs are built around the speedy Intel 486 processor family. And in the future, the Green PCs will be upgradable with the Pentium™ OverDrive™ processor.



Your applications and your personnel can perform at top speed and peak efficiency.

"Of the models we tested, Austin's Green PC 486/66 was the clear winner."
— PC World, August, 1993

Great Value!

486SX-25 $1,549

212 MB Hard Drive, Dual Floppy, 14" NI SVGA Monitor

486 LB Systems

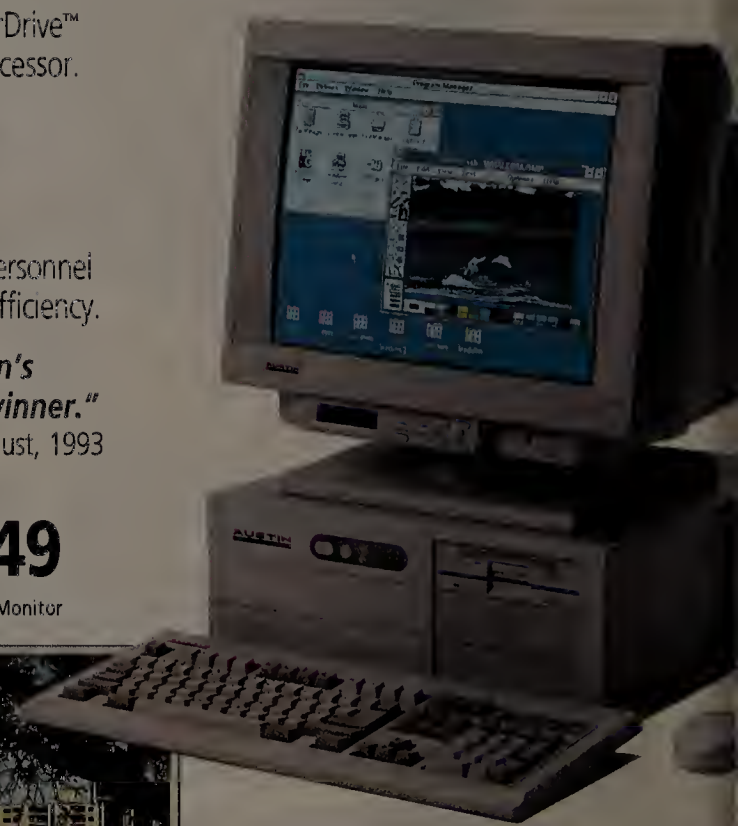
Popular features, workhorse performance, and exceptional value are built in!

A low-cost 486 LB System provides the speed, reliability, and versatility to keep your busy office running smoothly now and in the future. Our basic workstations include a package of standard features unequaled in the market: the powerful Intel 486 processor, 128KB level 2 cache, and superior VL-Bus video performance, hard drive capacity, and expandability. You won't find these features elsewhere for our price. With some manufacturers, you won't find them at all!

Best Buy!

486DX2-66 $1,949

250 MB Hard Drive, 14" NI SVGA Monitor



Austin people are friendly, professional, and upbeat. Austin Computers is a five-time winner of the PC Magazine Editors' Choice Award. It recently received the PC Magazine Readers' Choice award for service and reliability, and PC World recently rated Austin #1 in service and support.

No wonder 70% of orders are from repeat customers!

AUSTIN'S TOWN LAKE

So much for so little! Like the city itself, Austin Computer Systems offers a wide variety of attractive features at an outstanding value.

PC MAGAZINE EDITORS' CHOICE
February 11, 1992
Austin 486-33i
Winstation

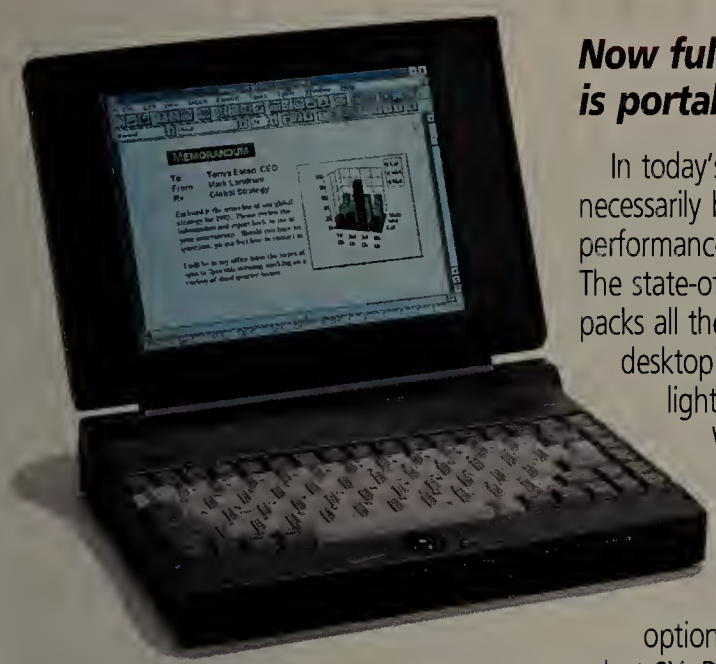
SERVICE & RELIABILITY • READERS' CHOICE • PC MAGAZINE

AUSTIN
AN IPC COMPANY

Call toll-free 1-800-331-1501

AUSTIN COMPUTER SYSTEMS • AN IPC COMPANY • 10300 METRIC BLVD., AUSTIN, TX 78758

CALL FOR INFORMATION OR OTHER CONFIGURATIONS 1-800-331-1501



486 High Performance Systems

We'll put you in a position of power!

If you demand maximum speed and power for complex applications, you need our 486 High Performance Systems. An STB Powergraph VL24 local bus Windows accelerator provides the speed and precision you need for video applications. And with digital controls and multi-mode memory on your 15" NI Super VGA color monitor, your monitor remembers the size and position settings for each video resolution.

Powered by Intel's fastest 486 processors—and positioned for an easy upgrade to the next-generation Pentium™ technology—these workstations offer a generous 256KB level 2 cache. It even includes a 2400 bps data/9600 bps fax modem with Trio DataFax software to speed your data to its destination.

Performance Plus!

486DX-33 $2,399

340 MB Hard Drive, 15" Digital NI SVGA Monitor

The Works!

If ultimate performance is your top priority, get "The Works"—our 486DX2-66 with 525 MB 10ms SCSI hard drive, 200ms dual speed CD-ROM, 14.4Kbps modem, STB Pegasus VL-Bus Windows accelerator with 4 MB VRAM, and 17" digitally-controlled Super VGA color monitor.

486DX2-66 $4,999

525 MB Hard Drive, 17" Digital NI SVGA Monitor

Austin 486 Notebooks

Now full desktop power is portable!

In today's competitive market, bigger is *not* necessarily better—and our compact, high-performance notebook computers prove it! The state-of-the-art Intel 486DX2-66 model packs all the speed and power of the best desktop workstation into a compact, lightweight case. A 32-bit local bus Windows accelerator provides the best notebook video performance available.

Order your notebook with the computing power and optional features that meet your needs: select SX, DX, or DX2 configurations with hard drives ranging from 130 to 340 MB.

With the active-matrix color models, you get a crisp, clear screen and the advantage of simultaneous CRT and LCD display—a must for impressive, portable presentations. The full-size keyboard is easy to use whether you're at your desk or in a plane, and the large 16mm trackball is located front and center for optimal comfort and control. The PCMCIA slots accept two Type II devices or one Type III device for communications and future multimedia options.

Ready to Run!

486SX-25 $2,999

130 MB Hard Drive, 9.5" TFT Active-Matrix Color LCD Display

Austin provides free consultation, a written proposal, and fast delivery of a complete, custom-configured network solution. Only from Austin!

intel inside

Accept only the finest Caviar WESTERN DIGITAL

Any Desktop Network Ready for $99

We install our easy-to-use, jumperless, 3-in-1 Ethernet Adapter with Novell Netware Lite and Novell Network Client drivers so your system is ready to network.

How could it be any easier?

Novell Gold Authorized Reseller

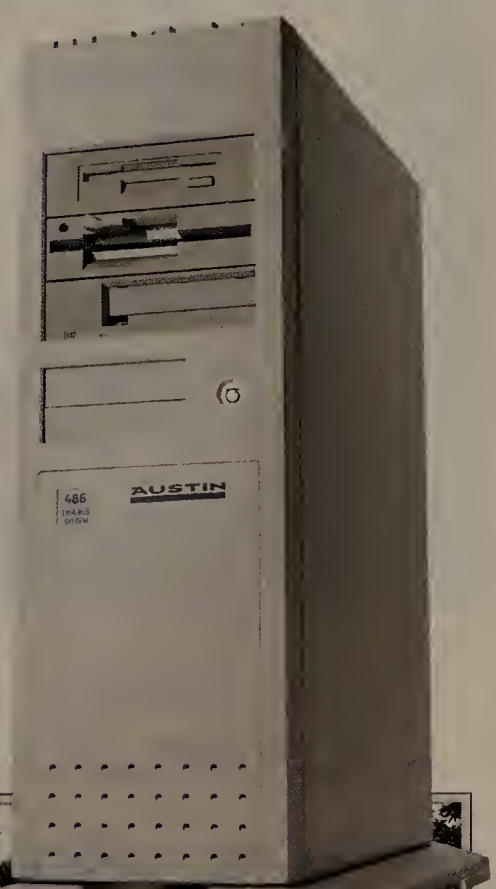
Super Server

The single server solution!

The Super Server uses the latest, most cost-effective fault tolerance technology, providing continuous, uninterrupted operation without loss of performance. Three hard drives work together to store your data and ensure its integrity, even in the case of a drive failure. If you can't afford data loss or down-time, the Super Server is your single solution.

486DX2-66 $9,999

2 GB RAID 5 Array, DAT Tape, 32-Bit Ethernet Adapter, 16 MB RAM, SVGA Monitor, EISA



BARTON SPRINGS POOL

Circle 10 on reader service card

CALL FOR OTHER CONFIGURATIONS AND AVAILABILITY 1-800-331-1501

Complete solutions from Austin Computer Systems

Novell-certified systems, anywhere in the U.S.

You can get a Novell-certified system—with all setup and installation included—anywhere in the U.S. And you can get it fast, because Austin operates an on-site Novell Certification Center. Our solutions are guaranteed 100% compatible with the world's leading network operating system.

Make the right investment for your future.

A network solution can be a great investment or a huge waste. You may find a lower initial price than ours, but if you want trouble-free service, ongoing support, and industry-standard systems that will grow with you, you'll keep coming back to us.

Austin's service and support make the difference!

With Austin Computer Systems, you get more than a box and a bill. You get a complete solution—a system that arrives ready to run, backed by award-winning service and support, and a 30-day money-back guarantee.

Our friendly, courteous staff will give you free, lifetime technical support seven days a week, free on-site service for one year through Data General, and a two year parts and labor warranty.

Now you know why everyone is moving to Austin. And staying.

Call Austin.

AUSTIN
AN IPC COMPANY

1-800-331-1501

FAX 512-454-1357
Overseas 512-339-3500
Canada 1-800-338-1565

© 1993 Austin Computer Systems. All rights reserved. Other product names or trademarks shown herein are for illustrative purposes only and may be the property of other companies. Prices listed here are special promotional prices. Prices and specifications are subject to change without notice. Intel Inside trademark logo is a trademark of Intel Corp. Microsoft is a registered trademark and Windows and the Windows logo are trademarks of Microsoft Corp.

MediaMagic

Whether you choose the basic audio board or our total multimedia solution with wave table MIDI synthesis, MPEG 2 audio, high-performance CD-ROM, speakers and more, you get the latest DSP technology. Let Austin make your next PC a MediaMagic PC.

486 Green PCs

Intel 486SX, DX, or DX2 Processor
4 MB RAM Expandable to 32 MB
128 KB Level 2 Cache
212 MB or 340 MB Hard Drive
Dual 3.5" and 5.25" Floppy Drive
Cirrus Logic 5428 Local Bus Windows Accelerator Integrated into Motherboard
14" NI Super VGA Color Monitor
Low-Profile Desktop Case
Two 5.25" HH Bays, One 3.5" Bay and One 3.5" Internal Bay
200 Watt Power Supply
Five 16-Bit ISA Slots
Wrist Rest Pad

486SX-25	**212 MB**	**$1,549**
486SX-33	**212 MB**	**1,699**
486DX-33	**212 MB**	**1,789**
486DX2-50	**340 MB**	**1,969**
486DX2-66	**340 MB**	**2,199**

486 LB Systems

Intel 486SX, DX, or DX2 Processor
4 MB RAM Expandable to 32 MB
8 KB Processor Cache and 128 KB Level 2 Cache
212 MB 13ms Hard Drive (Other drives available)
5.25" or 3.5" Floppy Drive
STB Horizon VL-Bus Windows Accelerator with 1 MB DRAM
14" Super VGA Color Monitor
Compact Desktop Case
Three 5.25" HH Bays, Two 3.5" Bays
200 Watt Power Supply
Six 16-Bit ISA Slots, Two with VL-Bus

486SX-25	**14" SVGA**	**$ 1,379**
486DX-33	**14" SVGA**	**1,599**
486DX2-50	**14" NI SVGA**	**1,749**
486DX2-66	**14" NI SVGA**	**1,939**

Standard for all Desktops and Servers

101-Key Keyboard, High-Resolution Mouse, Preinstalled MS-DOS 6.0, Windows 3.1, Diagnostics, choice of Lotus Write, Lotus Organizer, or Lotus 1-2-3 for Home on 486 LB Systems and 486 Green PCs; choice of Lotus 1-2-3 for Windows, Lotus Ami Pro, Lotus Improv or Lotus Freelance on other 486 Systems, Two-Year Warranty, One-Year On-Site Service Policy.

486 High Performance Systems

All features of the 486 LB Systems, plus:
8 MB RAM Expandable to 64 MB
256 KB Level 2 Cache
340 MB 13ms Hard Drive (Other drives available)
5.25" and 3.5" Floppy Drives
STB Powergraph VL24 Local Bus Windows Accelerator with 1 MB DRAM
15" NI Super VGA Color Monitor with Digital Controls and Multi-Mode Memory
2400 bps Data/9600 bps Fax Modem with Trio Fax Software

486DX-33	**15" NI SVGA**	**$2,399**
486DX2-50	**15" NI SVGA**	**2,499**
486DX2-66	**15" NI SVGA**	**2,699**
"The Works"	**17" NI SVGA**	**4,999**

Austin 486 Notebooks

Intel 486SX, DX, or DX2 Processors
4 MB RAM Expandable to 32 MB
130, 213, or 340 MB Hard Drive
3.5" Floppy Drive
32-Bit Local Bus Windows Accelerator Video
Monochrome or TFT Active-Matrix Color Monitor with Simultaneous Display
85-Key Keyboard with 16mm Front-and-Center Trackball
Two Serial Ports, One Parallel Port
Two- to Five-Hour Battery Life
11.1" x 8.58" x 2", 6.3 lbs.
Preinstalled MS-DOS 6.0, Windows 3.1
One-Year Warranty

486SX-25	**Mono**	**130 MB**	**$1,799**
486DX2-66	**Mono**	**340 MB**	**2,999**
486SX-25	**Color**	**130 MB**	**2,999**
486DX2-66	**Color**	**340 MB**	**4,499**

Super Server

Intel 486DX2 66MHz Processor
16 MB RAM Expandable to 128 MB
256 KB Level 2 Cache
Drive Disk Array with Three Hewlett-Packard 1.05GB 10ms SCSI-2 Hard Drives
DPT SmartCache III EISA to SCSI Adapter with Disk Array Module
5.25" and 3.5" Floppy Drives
DAT 2GB Backup System
Jumperless EISA Ethernet Adapter with AUI, 10-Base-2, and 10-Base-T
STB Horizon Windows Accelerator with 1 MB VRAM
14" Super VGA Color Monitor
Tower Case with 250 Watt Power Supply
Six 32-Bit EISA Slots, Two 16-Bit ISA Slots

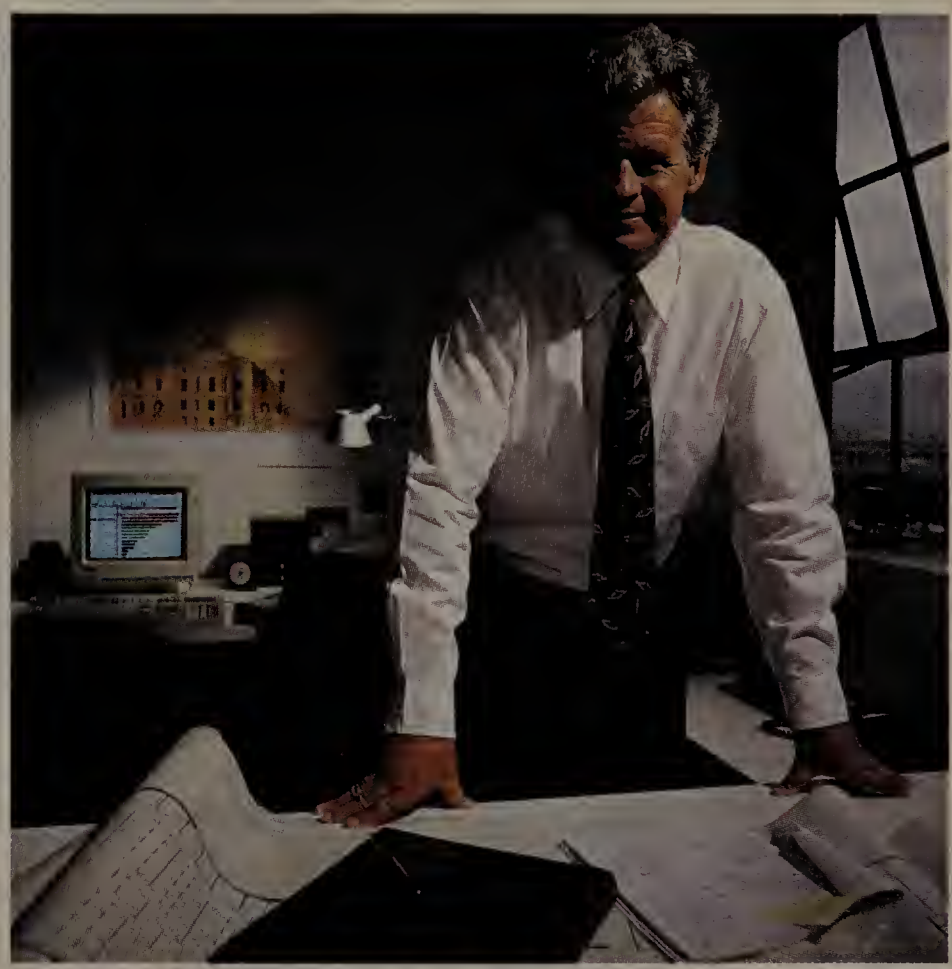
486DX2-66 EISA	**$9,999**

AUSTIN COMPUTER SYSTEMS • AN IPC COMPANY • 10300 METRIC BLVD., AUSTIN, TX 78758

Circle 10 on reader service card

After deciding to build a business from the ground up, the first thing I did was buy PageKeeper.

I love being my own boss. But I didn't want to become a slave to information. That's why one of my first investments was PAGEKEEPER.™ It makes managing information fast and simple. First, it automatically organizes my word processing files. Then Caere's state-of-the-art OCR lets me easily scan in industry articles, client correspondence, project proposals and more. Once scanned, PAGEKEEPER does the rest. It stores the scanned image so I can always refer to the original. And once it's stored, PAGEKEEPER always remembers where. Retrieving information is unbelievably easy. I simply type in a few words I think the document contains and PAGEKEEPER goes to work. I never have to memorize "keywords" or guess at categories. It even lists items in order of importance. And as my business grows, PAGEKEEPER can grow with me. That's why PAGEKEEPER is something great to build on. To get more information or to find a PAGEKEEPER dealer near you, give Caere a call at **1-800-535-SCAN**.



For Your Information.

Caere is a registered trademarks of Caere Corporation. The Caere logo and PageKeeper are trademarks of Caere Corporation.
© 1993. All rights reserved.

Circle 215 on reader service card

Task 2: The IntelliFone Story Brochure

Otherwise a straightforward design, our brochure tested two key design capabilities, process-color support and bleeds. *Process color* is the technology used to reproduce photographs and other full-color images at the print shop. *Bleeds* are graphics elements that run off (or end at) the very edge of the page.

Getting what comes off the press to match what you see on your computer screen is a delicate process, especially the final step, printing the separations to negatives on a high-resolution imagesetter. This procedure is not for the faint of heart. It can require a lot of trial and error at the neighborhood service bureau, which—at $25 to $80 per proof—can get expensive. Once you get your proofs right, you can count on another $15 or so per separation for the negatives. Each four-color page must have four pieces of film. A one-page, two-sided brochure, for instance, requires eight negatives. To generate your film, you need a page layout program that provides extensive control over process-color separations.

At the starting block, FrameMaker fell out of the race. Version 3.0 does not support process-color separations, so it could not import our CMYK TIFF photographs, let alone separate them. Version 4.0 will have some limited color separation support, however (see "Framing the Future").

Ventura doesn't support CMYK TIFFs either, but it does ship with an extension, Ventura Separator, that separates RGB TIFFs (the more common type) and CMYK and spot-color EPS files. Separator is a versatile utility. It allows you to set separation screen angles and other values for individual images or for the entire document. A substantial drawback is that Separator kicks in only while you're printing color separations. When printing proofs on a color printer, Ventura uses RGB TIFF data so proofs containing TIFF images are unreliable.

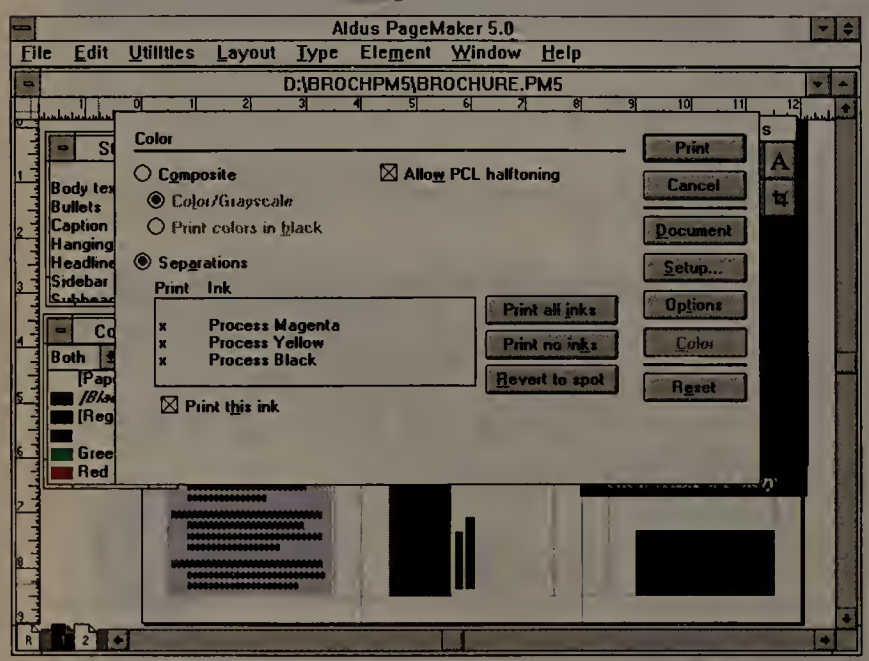
QuarkXPress and PageMaker are much more adept at process-color separations. Since they import and separate CMYK TIFFs, you get much more reliable proofs from dye-sublimation printers and other proofing devices.

Another big difference is the way Ventura handles bleeds. (Though we weren't able to finish our brochure in FrameMaker, we did discover that bleeds must be handled the same way as Ventura.) To run photographs and other graphics to the edge of a page, print shops require that the image run over the margin by about ⅛ inch. To run graphics off the page in Ventura we had to use the next largest predefined page size.

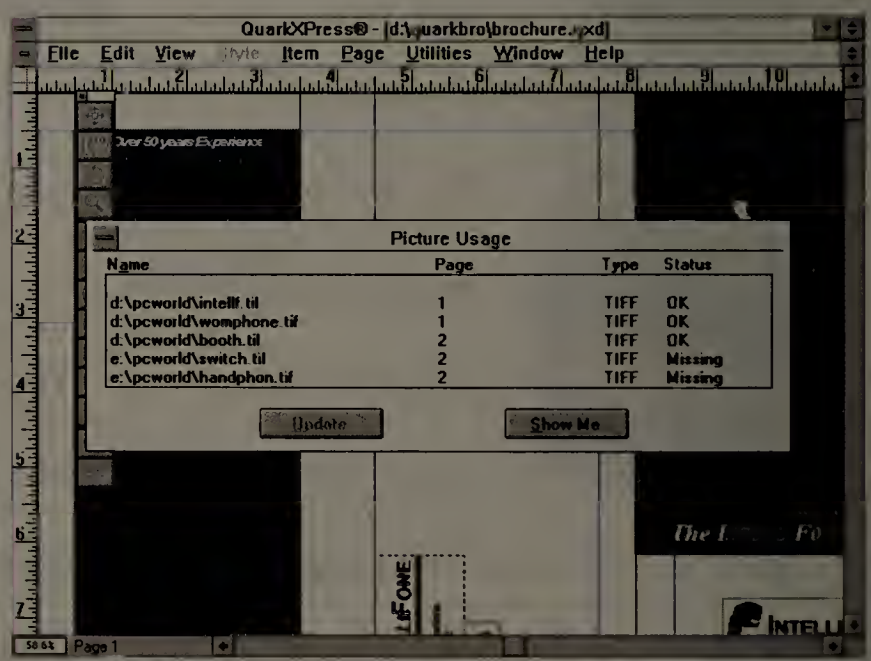
We used the 17-by-11-inch paper size, so we had no 12-by-9-inch page guides or border to work with. Instead Ventura forced us to eyeball our bleeds on the ruler. Having to use dimensions different from the finished size was doubly difficult because it changed the column placement, which made figuring out where our brochure folded much too complicated. Had Ventura let us define a 12-by-9-inch page, we could have simply folded it at the 4-inch and 8-inch marks, or in thirds.

Finally, the page size also increases the cost of producing the document. Many service bureaus charge more for a 17-by-11-inch page than a 12-by-9-inch page.

QuarkXPress and PageMaker, on the other hand, eliminate the fuss by letting you place elements over the edges of the page. And, while both programs have nonprinting guidelines, QuarkXPress allows you to set them anywhere in the editing area, even on the pasteboard. To place our bleed elements, we set guidelines ⅛ inch off the edges of the brochure and snapped our images to them.



TO REPRODUCE FULL-COLOR DOCUMENTS at a print shop, you need a program that can produce process-color separations. Here, PageMaker is about to output CMYK separations for four-color printing.



BY USING LINKS TO IMAGE FILES, instead of importing them directly into the document file, DTP programs keep document files from getting too large to manage conveniently.

The Tandy Sensation Can Recite The Speeches Of JFK.

It can let you hear the words "ask not what your country can do for you," as only JFK could speak them. And tell you just how those words travel through your ears to your brain with a vivid animation sequence. It can read back to you over the phone the time and place of your business meetings for the week. And pronounce for your child a word she couldn't say herself. It can play an aria from *Madame Butterfly* in full digital stereo sound. And give you the final word on how the stock exchange did for the day. It can even answer your phone and take a message when your mother-in-law calls from Miami. But perhaps what says the most about the Tandy Sensation isn't what it can say, but what it can make others say. Reviewers at such respected computer journals as *BYTE* Magazine, *Compute* and *PCM*, for example. Because in the past few months, the Sensation, with its CD-ROM drive and 486SX microprocessor, has received glowing reviews from each one of these magazines for its power, versatility and usefulness. And the good word keeps spreading. Which speaks volumes, of course, for why you should stop by your neighborhood Radio Shack to see and hear a Tandy Sensation for yourself.

> Overall kudos go to Tandy's Sensation; it's a well thought out execution of what every MPC (multimedia personal computer) system manufacturer should strive to emulate.
>
> *-Greg Loveria*
> *-BYTE Magazine*
> *May 1993*

It Can Also Make Magazine Editors Talk.

The Intel Inside logo is a registered trademark of Intel Corporation. IBM is a registered trademark of IBM Corp.

TANDY® Sensation!™

intel inside

Not just IBM®-PC Compatible, Family Compatible.

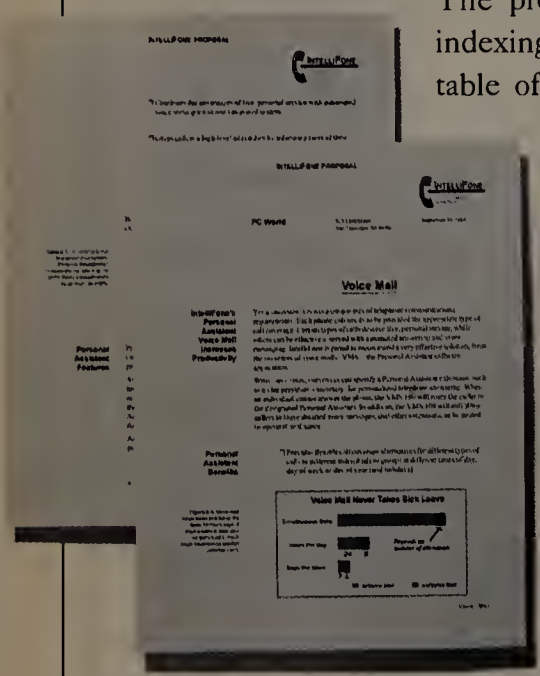
Available exclusively at Radio Shack.

Task 3: The Telecommunications Sales Proposal

Companies like our fictitious IntelliFone generate hundreds of sales proposals each year. Since our proposal changes with each client, product sections come in and out as needed, then we repaginate the document and generate a new table of contents and index.

QuarkXPress can't handle long documents of this nature. It provides no way to compile multiple files into one work, or to generate tables of contents and indexes. In the Macintosh version, third-party extensions, or add-ons, take care of these tasks. So far, about 30 of the extensions out of 150 or so have been translated to the Windows version.

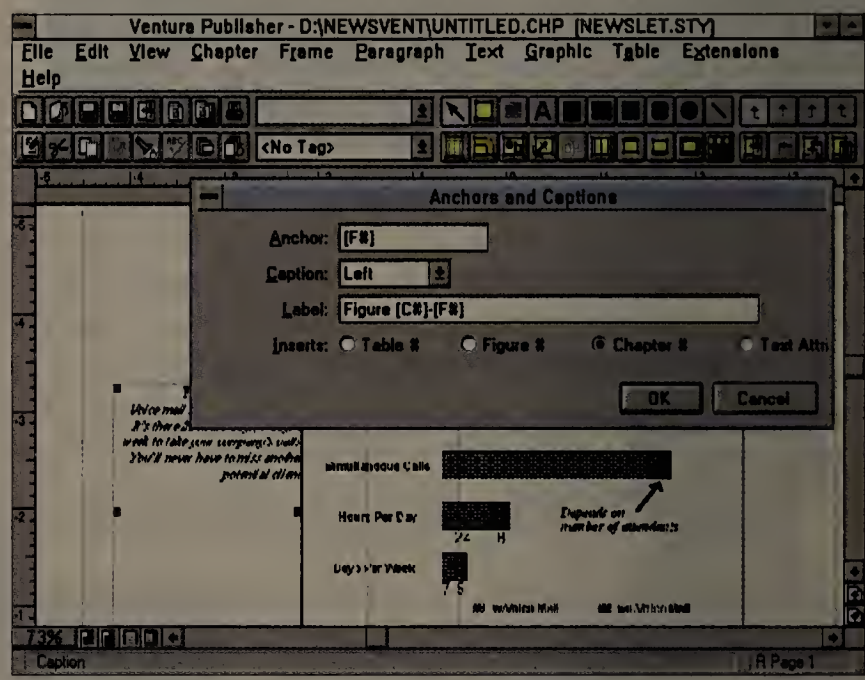
PageMaker did fairly well with the proposal. Its Book feature allowed us to swap our sections in and out and repaginate them. The program's table of contents and indexing features are robust. You define table of contents entries in paragraph styles, which means you don't have to mark each one separately. Indexing in PageMaker is also highly versatile. While defining index entries in one chapter, for example, you can cross-reference index data in other files without opening them.



A serious limitation of PageMaker's Book option, however, is the inability to copy all the chapters and supporting files in your long document to a new drive or directory. If your book sections contain linked files you must open each file and resave each one under a new name to copy them. This is extremely awkward, especially when compared with Ventura's Manage Publications feature, which copies all the files in a long document, as well as all supporting files. FrameMaker has a similar long-document file management feature.

FrameMaker and Ventura eventually pulled way out in front of PageMaker in long-document handling, primarily because of their variables features. For example, our proposal contains several tables and figures (charts and graphs, in this case) referenced according to section numbers, such as "Figure 2-2," "Table 3-2," and so on. As we moved sections in and out of our proposal, these numbers changed automatically.

Ventura allows you to generate captions with figure and table variables built in. Every time that you make a change that affects caption numbering, you can renumber the captions automatically. You can achieve the same results with FrameMaker, but not as easily. In PageMaker (no matter how well you understand the program) you must make these changes manually in each section.



USING VARIABLES TO NUMBER FIGURE CAPTIONS, as Ventura Publisher allows, lets you move or delete figures at will—captions are renumbered automatically.

The variables options in both FrameMaker and Ventura allowed us to change customer names, addresses, and proposal dates automatically—across all files and in headers and footers. Again, PageMaker forced us to open each file separately and search and replace each item individually. In documents consisting of many

Crossing Platforms

High-end desktop publishing has historically been a step or two ahead on the Macintosh. With the addition of process-color separations to PageMaker for Windows and the recent migration of QuarkXPress to the PC, this round of Windows layout packages finally closes the gap. However, most desktop publishing service bureaus, where desktop publishers get their high-resolution imagesetter and color proofing output, still cater primarily to Macintosh users. It helps considerably if your page layout program is compatible with its Mac counterpart.

All four of the programs reviewed here have Macintosh versions, but they are not all 100 percent compatible. Ventura Publisher Macintosh Edition, for example, does not support System 7, the current Macintosh operating system.

QuarkXPress for Windows can open Mac files (with some font tracking limitations); however, as of this writing, you can't open your PC files in the Mac version. According to Quark, version 3.2 on the Mac, due out by the time you read this, will open your QuarkXPress for Windows documents.

The trip across platforms is relatively reliable for PageMaker and FrameMaker users. PageMaker 5.0's Panose font substitution feature notifies you of missing fonts and lets you choose substitutions.

If you plan to print your files at the neighborhood service bureau, make sure the Macs there can open and print your page layout program's files. There are ways around this, such as using PostScript print files, but there's no substitute for good cross-platform compatibility.

New Northgate® Superb™ Series Featuring...

A Full-Featured 486SX/25 Color System For Only $999!

(Back to the drawing board, Dell.)

If you think Dell's Performance 333s/L is the best value going, Northgate has a real eye-opener for you.

Presenting the Northgate Superb 486SX/25...a gutsy, power-packed system that gives you genuine 486SX performance, a generous 120MB hard drive and i486™ upgradability...for the same price as Dell's Performance 333s/L.

And there's even more! You get a VGA color monitor, DOS 6.0, Windows 3.1, a mouse and more. To top it off you get our award-winning service featuring our legendary 24-hour toll-free technical support.

When you add it all up, the choice is clear. For you it's the Northgate Superb 486SX/25. For Dell, it's back to the drawing board.

Compare...Northgate Beats Dell Cold!

	Northgate Superb 486SX/25	Dell Performance 333s/L
Processor	i486SX/25	i386SX/33
i486™ Upgradability	Yes; full range	No
Hard Drive	120MB	80MB
RAM	2MB	2MB
Video	14" VGA; 640x480	14" VGA; 640x480
Floppy	One	One
MS-DOS, Windows 3.1 and mouse	Yes	Yes
Price	$999	$999

Offer available for a limited time, so...

Call To Place Your Order Now! 800-874-5767

GSA #GS00K91AGS5193 PS01

Major credit cards, money orders, direct wire and approved company purchase orders accepted.

NORTHGATE

7075 Flying Cloud Drive, Eden Prairie, MN 55344

© Copyright Northgate Computer Systems, Inc. 1993. All rights reserved. Superb, Northgate, and the Northgate logo are trademarks of Northgate Computer Systems. i486, Intel and the Intel Inside logo are registered trademarks of Intel Corporation. Prices and specifications subject to change without notice. Prices shown are U.S. dollars and do not include shipping and handling charges or appropriate sales taxes. Northgate reserves the right to substitute components of equal or greater quality or performance. All items subject to availability and offer is valid in the U.S. and Canada only.

sections, this is a tedious and time-consuming process. It is also the kind of detail that's easy to forget, which can be embarrassing—even disastrous.

PageMaker also fell short by not providing a built-in table editor. FrameMaker and Ventura both have strong table functions. Importing data into tables and keeping it current is simple in both programs. In FrameMaker, for example, tabular data from a WordPerfect file imported perfectly into the cells of our tables.

Our proposal is not particularly long on design. The layout did, however, raise some issues worth noting. The first three or four words in the paragraphs that start chapters contain *small caps*, or capitals set the same size as lowercase letters. Neither Ventura nor FrameMaker supports this feature.

PageMaker imported WordPerfect's small caps cleanly, as well as registered trademark symbols (®) in superscript and other special characters. Ventura, FrameMaker, and Quark imported the characters but not the superscript formatting. We had to search them out and reapply the formatting—a real nuisance.

A recurring complaint about PageMaker is that it does not support frame anchoring. Anchoring allows you to attach elements to other elements or to coordinates on a page. In our proposal, headings and captions are set in the margins next to the body text they pertain to. Without anchoring, each time we made a change in PageMaker that caused body text to move, we had to realign the heads, captions, and graphics manually.

Ventura provided the best approach to this problem. Not only does it allow you to anchor frames to paragraphs, but you can also place two paragraphs on the same line with the Break After option. This allowed us to align heads and body text without creating separate frames for the headings, which proved the only foolproof method to assure that headings stayed adjacent to the appropriate text, no matter what revisions we made to our proposal.

William Harrel is a desktop publisher based in Weaverville, California. He has written books on desktop publishing, including one on Aldus's PageMaker and two on Ventura Publisher.

For more information about all products in this article, circle reader service no. 908.

FEATURES COMPARISON

Windows DTP Features Blossom

● Yes ○ No n/a = not applicable

	FrameMaker for Windows 3.0	PageMaker for Windows 5.0 (BEST BUY)	QuarkXPress 3.1	Ventura Publisher Windows Edition 4.1.1
List price	$795	$895	$895	$795
Layout features				
Anchor frames	●	○	○	●
Column balance	●	●[1]	○	●
Conditional text and graphics	●	○	○	○
Element libraries	○	●	●	○
Font and picture usage lists	●	●	●	○
Generates captions	○	○	○	●
Interruptible display	○	●	○	○
Lock objects in place	●	○	●	○
Missing font notification	●	●	●	○
Missing font substitution	○	●	○	○
Multiple master pages	●	○	●	n/a
Multiple paste	●	●	○	○
Rotate text and graphics	90 degrees	any angle	any angle	90 degrees
Ruler guides	○	●	●	○
Set ruler guides off of pages	○	●	○	○
Set ruler guides off of codes	○	●	○	●
Supports scanning	○	●	○	●
Printing features				
Prints thumbnails	●	●	●	○
Process-color separations	○	●	●	●
Long-document features				
Renumbers figures and tables automatically	●	○	○	●
Compiles books	●	●	○	●
Numbers paragraphs	●	●[1]	○	●
Generates TOC, indexes	●	●	○	●
Work on TOC across multiple documents	●	●	○	●
Variables	●	○	○	●
Miscellaneous features				
Free support	30 days	90 days	90 days	90 days
Online reader	●	○	○	○
Scripting language	○	●	○	○

[1] With addition.

WHERE TO BUY

FrameMaker for Windows 3.0
Frame Technology Inc.
800/843-7263, 408/433-3311
Reader service no. 780

PageMaker for Windows 5.0
Aldus Corp.
800/333-2538, 206/628-2320
Reader service no. 781

QuarkXPress 3.1
Quark Inc.
800/788-7835, 303/894-8888
Reader service no. 782

Ventura Publisher Windows Edition 4.1.1
Ventura Software
800/822-8221, 619/673-0172
Reader service no. 783

It sits,
lies down,
and does
back
flips.

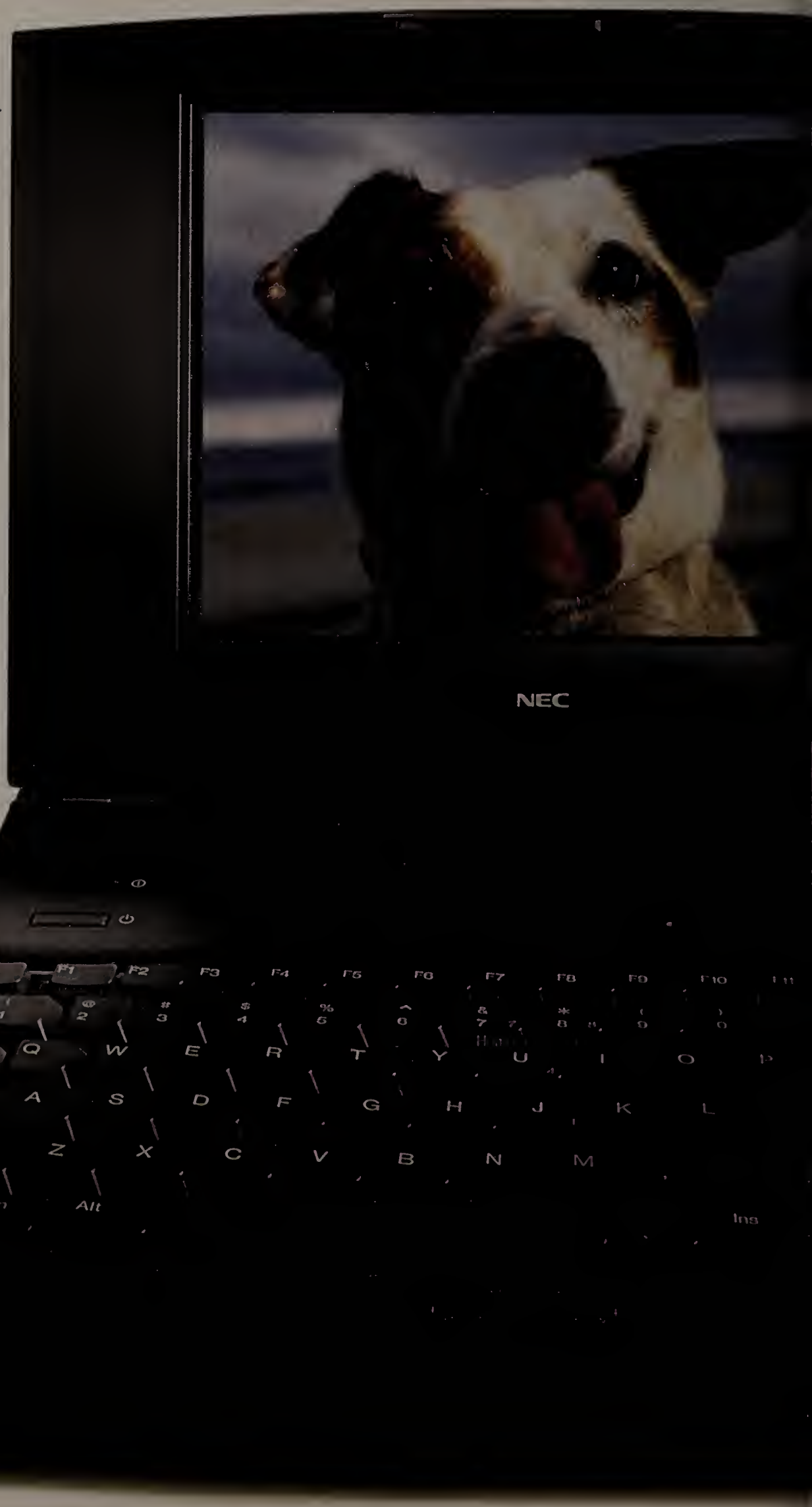
Good b

The most flexible screen ever seen.

It opens flat up to 180°.

Or flips around in just seconds.

There's even a Docking Station™ unit for full desktop computing.



oy.

The UltraLite® Versa™ notebook gives new meaning to the term "faithful companion."

Versa functions as a pen-based tablet to enter notes or data.

The reversible screen makes presentations a snap.

The UltraLite Versa is truly a breed apart. It's versatile and adapts easily to meet your changing needs, whatever and wherever. For example, switch from a mono to color screen, or put in more hard-drive memory. And despite its heavy-duty technology, the Versa weighs as little as 6 pounds.

Then there's the most sophisticated and flexible display on the market. Use it as a basic notebook, flip it around for presentations, or use it as a pen-based tablet. Plus, Versa's screen provides sharp contrast and brilliant graphics, monochrome or color.

With up to 10 hours of battery life, the one thing it won't do is play dead.

Yes, the Versa notebook knows a lot of tricks. Its i486™SL processor is fast and powerful, yet conserves power. Simply swap the floppy drive for an extra battery, doubling battery life.

And what's a notebook computer if you can't take it for long walks? Advanced PCMCIA communications capability means you can easily send and receive faxes and retrieve data.

We'll even come when we're called.

In addition to a standard 3-year limited warranty, you get UltraCare℠, an enhanced, full-service program providing fast response and support anytime, anywhere, at home or overseas.*

Begging for more? Call 1-800-NEC-VERSA or for info via fax, NEC FastFacts™ at 1-800-366-0476, request document 8583772.

Because ⬆ is the way you want to go.

NEC

Communications Features

Using thin, credit-card-sized cards, you can send and receive faxes, talk to your network, or ensure secure data storage. And for advanced, real-time mobile communications, Versa is even ready for wireless and cellular connectivity and also incorporates the newest PCMCIA technology.

- Accommodates two Type II cards or one Type III card
- Simultaneous card capability: data/fax modem, LAN, storage
- QuickSwap™ compatibility, for features such as changing cards without powering down

The UltraLite Versa is the first of a new series of computer products from NEC designed to work together with enhanced functionality and advanced ergonomics.

With the UltraLite Versa you can choose your own best friend.

Features/Options

Versa's many standard and optional features provide exceptional upgradability and flexibility, to give you the power to choose the system you need today and then enhance its features as your needs change.

Battery

- DoubleTime™ technology, for increased battery power
- Long-life NiMH battery pack: 2.5 to 5 hours (color) and 4 to 6 hours (mono)
- Optional secondary battery: for a total of 5 to 10 hours (color) and 8 to 12 hours (mono)

Storage and memory

- Choice of 120MB, 180MB, or 250MB easily removable hard drives; no tools required
- Slide-in memory cards, for upgradability from 4MB all the way to 20MB**

Processor

- i486SL processor, 25MHz or 33MHz
- Built-in numeric coprocessor and 8KB cache

Screen

- High-speed local bus video and desktop-level 640 X 480 display
- NEC-upgradable to pen capability,** mono or color
- Standard 9.4" STN sidelit Super VGA monochrome screen, with 64 shades of gray
- Optional 9.45" TFT active-matrix Super VGA color screen, with wide-angle viewing and 256-color display out of a possible 226,000

Docking Station

- 2 full-sized ISA slots, for expandability
- 3 drive bays: 2 external 5.25" and 1 internal 3.5"
- Integrated microphone and headphone ports

Pointing Device

- Custom Ballpoint™ mouse standard

VersaPad

NEC's new VersaPad™, the ideal platform for corporate pen computing. Perfect for data collection and transmission needs, including inventory control, sales force automation and merchandising.

- Full-function i486SL portable tablet computer
- Slim 4-pound design with VGA transflective screen for clear indoor/outdoor viewing
- 2 PCMCIA Type II slots, for flexible communications and storage
- NiMH battery options and advanced power management, for long battery life
- Available with all major pen computing environments, including Windows for Pen Computing™ and PenPoint™ software

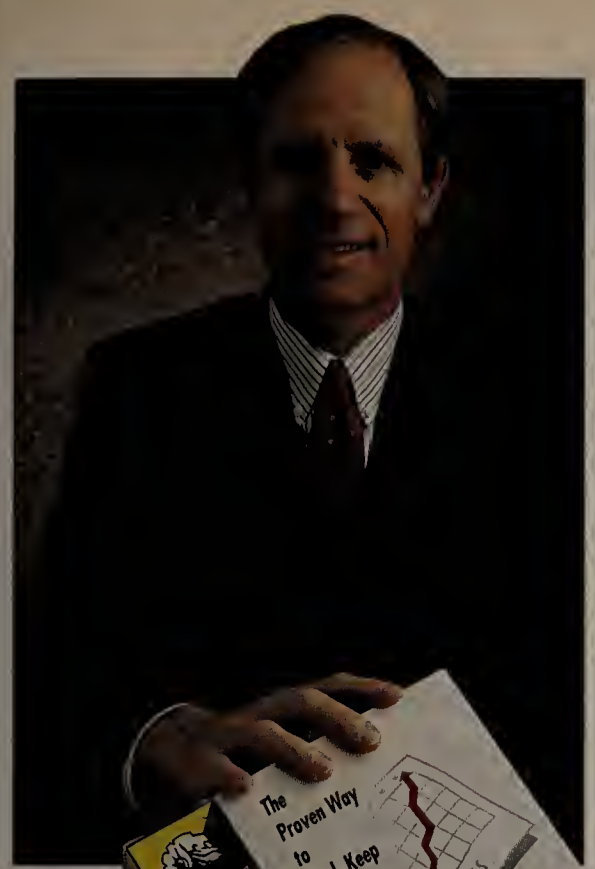
BUYERS ASSURANCE SEAL

intel inside

NEC

NEC GSA#GS00K91AGS5241

*3-year limited warranty with one year of UltraCare is standard. Additional two years of UltraCare coverage is available for $99. **20MB and Pen upgrade options available 4th quarter 1993. UltraLite is a registered trademark of NEC Corporation. UltraLite Versa, VersaPad, FastFacts and DoubleTime are trademarks and UltraCare is a service mark of NEC Technologies, Inc. Docking Station is a trademark of NEC Home Electronics, Inc. The Intel Inside logo is a registered trademark of Intel Corp. All other trademarks and registered marks are property of their respective owners. Specifications subject to change without notice. © 1993 NEC Technologies, Inc.



"ACT! WILL MAKE YOU MORE SUCCESSFUL IN 30 DAYS OR YOU DON'T PAY."

PATRICK SULLIVAN
PRESIDENT, CONTACT SOFTWARE INTERNATIONAL

THE BEST-SELLING SOFTWARE THAT'S CHANGING THE WAY AMERICA DOES BUSINESS.

All over America, people are joining the ACT! revolution. Piling up prospects. Doing two, even *three times* as much business as before. And astonishing their customers with a level of personal service they've never experienced.

For over *half a million* success-driven people, ACT! has already become a way of life!

THE PROVEN WAY TO *FIND, KEEP* AND *SATISFY* YOUR CUSTOMERS.

In the race for new customers, your competition is breathing down your neck. With ACT!, you'll leave them in the dust.

Pop-up reminders let you know exactly who you need to call, when, and what about. You can easily stay on top of *hundreds* of leads, prospects and customers!

Want to send a thank-you note, or a bunch of prospect letters? Just use the built-in word processor with spell-checker, or select one of your pre-written form letters.

ACT! runs on PCs under both DOS and Windows, as well as MACs, PowerBooks and HP 95LX palmtop PCs. It's ideal for mobile professionals.

Then let ACT! fill in the names and addresses, and print the letters and envelopes. *There's no need to type to keep in touch!*

Your customers will be *blown away* by your impeccable, personal service. While you're on the phone, you'll have instant access to every detail about the person you've called – including past phone conversations and letters sent, schedules and "next steps." Even the little things – a spouse's name, or a favorite restaurant – that make people feel truly valued and *ready to do business.*

With ACT! in control of the details, you're free to concentrate on *profitable, business-building activities.* Users report *doubling or tripling* their business volume with ACT!

Need to change an appointment? ACT! is your comprehensive activity planner, too. Just "drag and drop" the meeting into its new time slot. Then print your revised daily, weekly or monthly calendar. *You'll never forget another call, meeting or to-do!*

You can also track and analyze your progress with a variety of reports, including prospect reports, activity reports, customer history reports and more.

WHAT THEY'RE SAYING ABOUT ACT!

"Champion among contact managers."
Jim Seymour
PC Sources Magazine

"ACT! for Windows and my notebook computer are the ultimate sales combination."
Lon Orenstein
Computer Support Network

December 25, 1990
Act!, Version 2.0

November 1992

"I've tripled my business since I started using ACT! It's a miracle."
John Rizzuti
Rizzuti Marketing and Media

"Really shines in the ease-of-learning-and-use department."
Mark McIntire
PC Laptop Magazine

"A first-class way to keep everything on the table, not down in the cracks."
Greg Keizer
PC Magazine

You're successful now. But you won't believe how much *more* you can achieve with ACT! at your side. *Take advantage of this limited-time offer and call today!*

FREE 30-DAY TRIAL!

Try ACT! free for 30 days. Simply pay the $9.75 shipping & handling charge with a major credit card. If you don't see *bottom-line results* within 30 days, just return it and you'll owe nothing more. But if ACT! boosts your success like we say it will, keep it – and pay a limited-time price of only $199 *(that's half the $395 suggested retail price).* Don't let this extraordinary offer pass you by!

Call now for your free trial copy!
1-800-370-8997

OR SEE YOUR SOFTWARE DEALER...
For a limited time, you can get a great deal through your software dealer, too. **Just call the number above to request your $100 rebate certificate** (free trial not available through dealers).

ACT!®
The Best-Selling Contact Manager

© 1993 Contact Software International. Rebate not available on ACT! for Macintosh. ACT! for Macintosh suggestedretail is $249.95. Offer good for end-user purchases of ACT! for Windows orACT! for DOS between June 1, 1993 and September 15, 1993 from software resellers only. Valid product serial numbers and purchase signature must be present to receive rebate. Not applicable to education, upgrade, and other specially priced product. Not valid with any other promotion. Offer not available for resellers. Offer valid only in the U.S.A. and Canada. Prices listed in U.S.dollars. Limit one rebate or one special $199 offer per customer. Other brands and products are trademarks of their respective holders.

Circle 67 on reader service card

Overnight shipping.

1990, 1991 and 1992 World Class Awards
for Best Mail-Order Company

All software is not copy-protected, unless indicated otherwise by *(CP)*.

The four- or five-digit number next to each product is the product's ITEM NUMBER. Please refer to this number when ordering. Thank you.

We carry only the latest versions of products. Version numbers are current at press time. Products listed here in red are Microsoft Windows Applications.

COMPUTERS

Compaq Computer ... 3 years
12166 ProLinea 4/25S w/Local Bus, 120 MB, Windows $1099.
9549 ProLinea 4/25S w/Local Bus, 240 MB, Windows.. 1299.
12360 ProLinea 4/50 with 240 MB, Windows..... *while supplies last* 1549.
10893 ProLinea 4/50 w/Local Bus, 240 MB, Windows 1899.
10894 ProLinea 4/50 w/Local Bus, 240 MB, Windows, ... Modem, PFS Window Works, Prodigy ..... 1999.
12176 ProLinea 4/66 with Local Bus, 340 MB, Windows, Modem, PFS Window Works, Prodigy ..... 2299.
9552 Contura 3/25 with 120 MB, Windows..... *while supplies last* 1599.
11420 Contura 4/25 with 209 MB, Windows ..... 2199.
11415 Contura 4/25CX with 209 MB, Windows ..... 3399.
11453 DESKPRO 4/25is with 120 MB, Windows..... 1450.
11646 DESKPRO 4/66M with 510 MB, Windows ..... 3649.
2016 LTE Lite 4/25 with 120 MB, Windows ..... 2525.
3019 LTE Lite 4/25E with 120 MB, Windows ..... 3099.
3029 LTE Lite 4/25E with 209 MB, Windows ..... 3385.
Monitors not included.

BUSINESS APPLICATIONS

Automap
2729 Automap USA for DOS.. 55. 8569 Windows.. 55.
Avantos
12022 ManagePro 2.0 *(12021 5¼")* ..... 219.
Banner Blue Software
2088 Org Plus 2.0 for Windows ..... 125.
Borland International
10616 Quattro Pro Win. *(3½" only)* .. *while supplies last* 95.
10710 Paradox Windows *(3½" only) while supplies last* 129.
11915 Borland Office for Windows *(3½" only)*..... 395.
11978 Office for Windows Comp. Upgrd. *(3½" only)*... 299.
Caere
8933 OmniPage Pro 2.1..... 629.

Borland International
11978 *Borland Office for Windows (3½" only) Comp. Upgrd.*—Borland's Paradox & Quattro Pro, with WordPerfect 5.2, provide the ultimate in business applications ..... **$299.**
11915 *Borland Office for Win. (3½" only)* **395.**

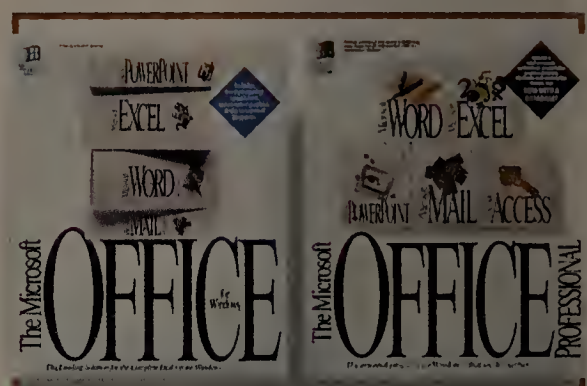
CE Software
3532 CE Power Pak *(3½" only)*..... $79.
Claris Corporation
10996 ClarisWorks Win. 95. 5257 FileMaker Pro Win. 119.
5228 FileMaker Pro for Windows Competitive Upgrade.. 95.
Intuit
2426 Quicken 6.0... 45. 5596 2.0 for Windows ..... 45.
LaserTools
6882 PrintCache 3.1 ..... 49.
Lotus
2756 1-2-3 4.0 for Windows *(2755 5¼")* ..... 309.
3428 1-2-3 4.0 for Windows Upgrade *(3424 5¼")*..... 99.
1847 Ami Pro 3.0 Competitive Upgrade..... 99.
10753 Improv for Windows *(3½" only)*..... *intro. price* 99.
5982 SmartSuite *(5981 5¼")* ..... 469.
MECA
2798 Managing Your Money ..... 32.
Microsoft
11325 MS-DOS 6.0 Upgrade *(11324 5¼")*..... 47.
7009 Windows 3.1 *(7010 5¼")*..... 89.
7841 Word for Windows 2.0C Comp. Upgrd. *(3881 5¼")* 125.
5695 Excel 4.0 Competitive Upgrade *(5693 5¼")*..... 125.
2931 Access for Windows 1.1 *(2932 5¼")* ..... 299.
10057 FoxPro 2.5 for Windows *(10056 5¼")*..... 299.
8138 Office 3.0 for Windows *(8137 5¼")*..... 449.
12848 Office Professional *(with Microsoft Access)*..... 589.
Nolo Press
2982 WillMaker 4.01 ..... 35.
Peachtree
12287 Accounting for Windows Release 2 ..... 115.
Polaris Software
4395 PackRat 5.0..... 249.
Software Marketing
8531 Autoworks..... 39. 12714 PharmAssist ..... 39.

WordPerfect
7582 *Presentations 2.0 DOS* ..... **$279.**
12352 *Presentations 2.0 DOS Upgrade* ... **79.**
12351 *Presentations 2.0 DOS Comp. Upgrd.* **105.**
3445 *Presentations 2.0 Windows* ..... **299.**
1501 *Comp. Upgrd.* **105.** 1500 *Upgrd.* **79.**

Symantec
1625 ACT! for DOS 2.11 259. 7435 Windows 1.03 259.
TIMESLIPS
5698 Timeslips Release 5 1.0..... 189.
WordPerfect Corporation
3445 Presentations 2.0 for Windows 299. 7582 DOS 279.
1500 Presentations Win. Upgrd.... 79. 12352 DOS.... 79.
1501 Presentations for Windows Comp. Upgrade.... 105.
12351 Presentations 2.0 for DOS Comp. Upgrade..... 105.
3795 WordPerfect 6.0 DOS 279. 6274 Ver. Upgrd. 99.
3497 WordPerfect 5.2 for Windows *(3494 5¼")*..... 279.
4795 WordPerfect for Windows Ver. Upgrd. *(4786 5¼")* 79.
6227 WordPerfect for Windows Comp. Upgrd. *(6228 5¼")* 99.

GRAPHICS & DESIGN

Adobe Systems
10774 Adobe Photoshop 2.5 for Windows *(3½" only)*. 548.
6439 Adobe Illustrator 4.0 for Windows *(6591 5¼")*. 429.
AGFA
10396 Discovery TrueType Pack..... 49.
Aldus
1085 FreeHand for Windows ..... 395.
11667 PageMaker 5.0 for Windows *(3½" only)*..... 579.
Altsys Corporation
8675 Fontographer for Windows 3.5 *(3½" only)*..... 259.
12551 Fontographer & Typestry Bundle ..... 279.
Application Techniques
1214 Pizazz Plus 4.0 *(Windows & DOS included)*..... 79.
Ares Software
6030 FontMonger 1.0.7 for Windows ..... 89.



Microsoft
8138 *Office 3.0 for Windows*—Word processing, spreadsheet, presentation graphics, & 1-user license for MS Mail *(8137 5¼")* **$449.**
12848 *Office Professional*—All of above, plus Microsoft Access. ..... **589.**

Corel Systems
5508 CorelDRAW! 3.0 *(5506 5¼")*..... 139.
11896 CorelDRAW! 4.0 *(11904 5¼")* ..... 389.
7923 CorelDRAW! 4.0 Upgrade *(7922 5¼")*..... 225.
DeltaPoint
3435 Graphics Tools! for Windows ..... 99.
Fractal Design
7822 Sketcher 1.0 for Win. 94. 4356 Painter 2.0 259.
Lotus
5005 Freelance Graphics 2.0 for Windows *(3523 5¼")* 349.
Micrografx
3628 Windows Draw! 3.0 *(3627 5¼")*..... 69.
Microsoft
10051 Font Pack 2Win. 45. 3337 Publisher 1.0 Win. 129.
Pixar Corporation
12552 Typestry & AGFA Discovery Bundle ..... 189.
Shapeware
5426 Visio 1.0 for Windows *(3½" only)*..... 199.
Software Publishing
4402 Harvard Graphics for Windows *(4403 5¼")*..... 369.
U-Lead Systems, Inc.
1733 ImagePals 1.2 *(3½" only)*..... 92.

SYSTEM UTILITIES & PROGRAMMING

AddStor
12029 Double Tools ..... 65.
Avery Dennison
6006 Label Pro 1.6 *(Laser)* ..... 49.
Berkeley Systems
9885 After Dark 2.0 for Windows.. 29. 3528 DOS .. 29.
12030 More After Dark (M.A.D.) for Windows *(3½" only)* 23.
6649 Star Trek: The Screen Saver *(3½" only)*..... 34.
Central Point Software
11393 Safe Six for Windows 1.0 *(3½" only)* ..... 37.
9555 Anti-Virus 2.0 *(9751 5¼")* or 8114 Backup 7.1 *ea.* 89.
5039 PC Tools 8.0a... 125. 11395 for Windows... 125.

Central Point Software
11395 *PC Tools 1.0 for Windows*—The long awaited PC Tools for Windows incl.: a new Desktop, File Manager, Desktop Accessories, Backup, Anti-Virus, Data & Disk Recovery, & an Event Scheduler *(11394 5¼")*.. **$125.**

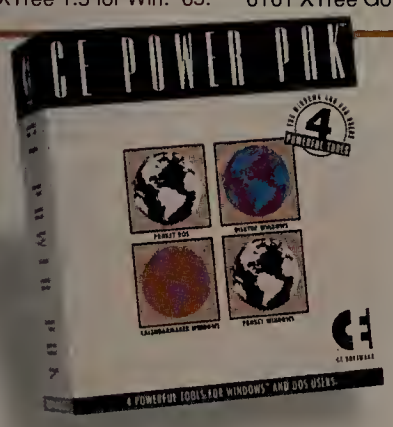
Weekends, too!

NOW FOR DOS!

Berkeley Systems

3528 *After Dark for DOS*—Invite flying toasters & their friends to your DOS-based PC! **$29.**
6649 *Star Trek: The Screen Saver (3½" only)* **34.**
9885 *After Dark 2.0 for Windows* ..... **29.**
12030 *More After Dark Windows (3½" only)* **23.**

Fifth Generation Systems
3950 Fastback Plus 6.0.. 95. 6431 for Windows.. 95.
Hewlett-Packard
8731 Dashboard 2.0 for Windows ..... 45.
MBS Technologies
11697 FileRunner 1.4 ..... 75.
Micro Logic Corporation
6787 Info Select DOS 12145 Windows ..... ea. 87.
Microsoft
10154 Visual Basic 3.0 Windows Std. Ed. *(3½" only)*.. 129.
11444 Visual C++ Standard Edition *(3½" only)* ..... 95.
PC-Kwik
8004 PC-Kwik Power Pak 3.1 w/Power Disk *(4925 5¼")* 45.
Qualitas
12541 386MAX 7.0 ..... 59.
Quarterdeck
3217 QEMM 7.0 *(3221 5¼")* ..... 59.
Stac Electronics
1409 Stacker 3.1 ..... 95.
Symantec
12294 The Norton Commander 4.0 *(3152 5¼")* ..... 65.
2360 The Norton Desktop 2.2 for Windows *(2359 5¼")* 115.
5136 The Norton Utilities 7.0 *(3146 5¼")* ..... 115.
8535 Norton pcANYWHERE 4.5 for DOS *(8378 5¼")* 119.
11303 Norton pcANYWHERE 1.0 for Win. *(11304 5¼")* 129.
12413 Merge/Convert 1.0 for DOS ..... 199.
TouchStone Software
11665 Check√It Pro: Set *(Volume I & II included)* ..... 79.
2338 Check√It Pro: Deluxe 1.0 ..... 135.
XTree
8957 XTree 1.5 for Win. 65. 6161 XTree Gold 2.5 95.



CE Software

3532 *CE Power Pak*—Windows and DOS. ProKey replaces repetitive tasks with mouse clicks or keystrokes. Sort through files quickly with DiskTop. CalendarMaker creates presentation-quality calendars *(3½" only)* **$79.**

NETWORKING/COMMUNICATIONS

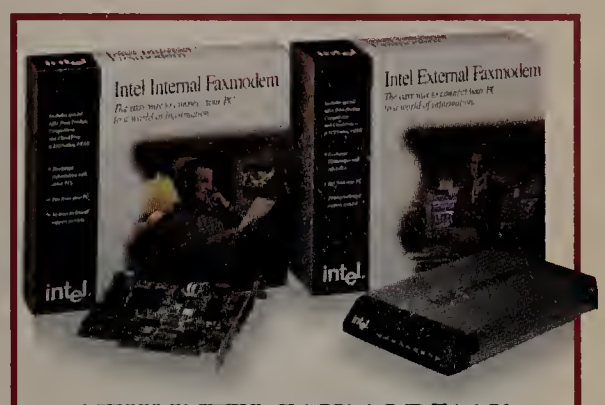
3 Com ... lifetime (conditional)
3453 EtherLink II/16..... $159. 3469 II/16 TP .... $169.
Asanté Technologies ... 5 years
2775 8 Port Hub..... 249. 2772 12 Port Hub..... 499.
EtherPac Ethernet Cards ..... call
Artisoft
2234 Lantastic AE-2 EtherNet Starter Kit DOS 5.0... 459.
2452 AE-2 EtherNet Adapter Card ..... 199.
BOCA Research ... 5 years
8397 M1440I FaxModem.. 189. 8398 M1440E.. 219.
Caere
4130 FaxMaster 1.0 ..... 69.
Cardinal ... lifetime
8690 MVP24I MVP 35. 11634 MVP1441F FMVP 175.
CompuServe
10957 Windows Membership Kit 1.0 ..... 27.
Data Storm
4798 PROCOMM PLUS 2.01 69. 2006 for Windows 99.
DCA/Crosstalk
5611 Crosstalk 2.0 for Windows ..... 119.
Delrina Technology
5974 DOSFax PRO 49. 2446 WinFax PRO 3.0 79.
Hayes ... 2 years
11396 ACCURA 144 + FAX 144 *(external)* ..... 229.
11397 ACCURA 144 + FAX 144 *(internal)* ..... 199.
7391 ULTRA 96 Modem.. 599. 5024 ULTRA 144 . 669.
7395 OPTIMA 144 + FAX 144 ..... 389.
Intel ... 3 years
2994 EtherExpress 16 or 3021 16 TP ..... ea. 99.
1531 Faxmodem 14.4/14.4 *(int.)* 175. 1536 *(ext.)* 199.
5994 SatisFAXtion Modem/400 5995 Modem/400e ea. 399.
Megahertz ... 5 years
10515 C5144 14.4 Fax/Modem *(Compaq LTE/Contura)* 419.
10517 C524FM Fax/Modem *(Compaq LTE/Contura)* .... 215.
11817 XJ124FM 24/96 Fax/Modem *(PCMCIA card)* ..... 289.
Microcom
6234 CarbonCopy Plus 6.1 129. 4410 Windows 129.
Microsoft
6172 Windows for Workgroups Add-on *(6141 5¼")* ... 59.
Norton-Lambert
2754 Close-Up Dual Pack 4.0 *(2753 5¼")* ..... 119.
Novell
12058 NetWare 4.0 *(10 user)* 1899. 12056 *(25 user)* 2799.
We are now Novell authorized. Upgrades also available. Please call for details.
Practical Peripherals ... lifetime
3803 PM14400FX *(int. modem/fax)* 199. 10570 *(int.)* 215.
9234 PM14400FXPPM Pocket Fax/Modem ..... 359.
Shiva
NetModem/E for Windows for Workgroups ea. 1479.
Sofnet
5883 FaxWorks 2.5 *(Windows & DOS) (3½" only)* ..... 45.
Supra ... 5 years
11441 SupraFaxModem V.32bis External for DOS .... 239.
11442 SupraFaxModem V.32bis External for Windows 239.
Technology Concepts ... 2 years
6315 Fax Line Manager 203 ..... 125.
Traveling Software
4407 LapLink V ..... 99.
U.S. Robotics
11923 Sportster 14.4 FaxModem Int. 185. 11924 Ext. 209.
11922 WorldPort 14.4 Pocket FaxModem ..... 329.
11918 Courier V.32bis FAX Int..... 359. 11919 Ext . 399.
Zoom Telephonics ... 7 years
1494 Ext. 9600V.32..... 169. 3075 Internal..... 149.
3386 FaxModem AFC 24/96/48 *(internal)* ..... 49.
4430 FaxModem AFX *(2400 baud 96S/48R)* ..... 69.
4429 FaxModem VFP V.32bis 14,400 baud *(internal)* 189.
4428 FaxModem VFX V.32bis 14,400 baud *(external)* 209.
7921 Pocket FaxModem 24/96/48 ..... 87.

VIDEO & SOUND

Advanced Gravis ... 1 year
12032 Ultra Sound *(with 3-D software demo)* ..... 139.

800-800-0003

PC Connection **993PCW**
6 Mill Street
Marlow, NH 03456
SALES 603-446-0003 **FAX** 603-446-7791



NEW INTEL FAXMODEMS!

Intel ... 3 years

1531 *Faxmodem 14.4/14.4 (internal)*—Provide a vital link from your PC to the outside world. Includes QuickLink II FREE Prodigy, CompuServe and CheckFree kits..... **$175.**
1536 *Faxmodem 14.4/14.4 (external)* .... **199.**

ATI Technologies ... 5 years
12296 Stereo FX-CD 149. 12720 VGA Wonder GT 175.
3886 Graphics Ultra + 2 MB.. 249. 3871Pro 2 MB.. 369.
11022 Graphics Ultra Pro EISA *(with 2 MB)* ..... 399.
Boca Research ... 5 years
12374 VORTEK VRAM Accelerator 2 MB ..... 289.
Creative Labs ... 1 year
5770 Sound Blaster 16 ASP ..... 209.
10906 VideoSpigot for Windows ..... 429.
Diamond Computer ... 5 years
1696 SpeedStar Pro VLB ..... 115.
1569 Stealth 24 VLB.... 159. 1585 Viper VLB.... 415.
Hauppauge Computer ... 1 year
10593 Win/TV, Microsoft Video for Windows Bundle.. 459.
Intel ... 3 years
11587 Smart Video Recorder ..... 499.
KOSS Corporation
11323 HD-4 speakers *(with equalizer & AC Adapter)*... 55.
11700 HD-6 speakers *(with AC Adapter)* ..... 79.
Logitech ... 2 years
11462 SoundMan 16 ..... 139.
Media Vision ... 3 years
5637 ProAudio Spectrum 16 ..... 169.
12028 ProAudio Studio 219. 11478 ProMovie Spectrum 299.
7873 Fusion CD 16 Internal *(1 yr.)* ..... 499.
NEC ... 2 years
11949 MultiSync 3FGE Monitor *(13")* ..... 629.
11948 4FGE Monitor *(15")* 749. 11950 5FGE *(17")* 1149.
Video Seven ... 7 years
11647 WIN.SWIFT.. 115. 9261 WIN.PRO 1 MB.. 155.
1690 Mirage 1 MB VESA Local Bus ..... 173.

FREE V.FAST UPGRADE

U.S. Robotics

11919 *Courier V.32bis FAX External*—Protect your investment with a Courier 14,400 V.32bis FaxModem now, and receive a free 28,800 V.Fast upgrade when available **$399.**
11918 *Courier V.32bis FAX Internal* ..... **359.**

PC CONNECTION®

© COPYRIGHT PC CONNECTION, INC., 1993. PC CONNECTION, PCTV AND THE RACCOON CHARACTER(S) ARE REGISTERED TRADEMARKS OF PC CONNECTION, INC., MARLOW, NH. ALL OTHER TRADEMARKS REMAIN THE PROPERTY OF THEIR RESPECTIVE COMPANIES.

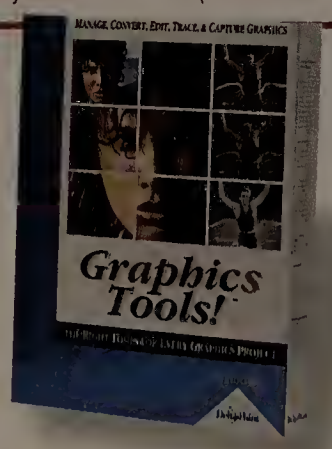
$5. Total. Period.

FREE GENOA 24-BIT GRAPHICS CARD w/SCANMAKER II & IIxe PURCHASE!
(offer expires 9/30/93)

Microtek ... 1 year
11860 *ScanMaker IIxe with Transparent Media Adapter*—Microtek's fastest color flatbed scanner. Incl. Media Adapter & free *Genoa Windows* VGA24, 24-bit video card **$1749.**
5187 *ScanMaker II* ..... **879.**

INPUT/OUTPUT

Appoint ... 1 year
12768 Jurassic Mouse Pen ..... 32.
Canon ... 1 year
7893 BJ10EX BubbleJet Printer *(white)* ..... 255.
7809 BJ-200 BubbleJet Printer 355. 12547 BJ-230 419.
CoStar ... 1 year
1814 LabelWriter II Plus ..... 239.
Epson ... 2 years
5555 AP-3250 *(80 col., 200 cps, 24 pin)* ..... 199.
11800 LQ570+ *(80 col., 269 cps)* ..... 269.
10784 Action Laser 1500 *(1 MB)* ..... 789.
Hewlett-Packard ... 1 year
7621 DeskJet Portable 439. 7620 DeskJet 550C 789.
6442 LaserJet 4 *(w/toner)* 1499. 12212 LJ 4L *(w/toner)* 729.
7970 LaserJet 4 Toner.... 109. 11884 *(3 pack)* ..... 319.
Kensington Microware ... 1 year
7899 Expert Mouse *serial*... 99. 7900 *bus* ..... 115.
Key Tronic ... 3 years
4518 101 Plus Keyboard ..... 99.
Logitech ... limited lifetime
3996 Trackman2 *(combo)*... 79. 2343 Portable ..... 99.
3295 Mouseman *(combo)*.... 69. 9766 *(cordless)* .... 89.
12421 AudioMan..... 135. 7975 ScanMan256 ..... 179.
Microsoft ... lifetime
7597 Microsoft Serial Mouse 77. 1896 Ballpoint Mouse 119.
2898 Mouse with Windows 3.1 *(bus or serial)* ..... 145.
MicroSpeed ... 1 year
11222 KB101 Keyboard 40. 6007 PC-TRAC Trackball 59.
Microtek ... 1 year
5187 ScanMaker II 879. 5175 ScanMaker IIxe. 1099.
11860 ScanMaker IIxe w/Transparent Media Adapter 1749.
11859 ScanMaker II with Transparency ..... 1449.
Mouse Systems ... lifetime
7878 PC Mouse III *(serial)*.. 69. 5427 NewMouse .. 62.
Mustek ... 1 year
8452 Gray Artist for Windows *(256 GS hand scanner)* 165.

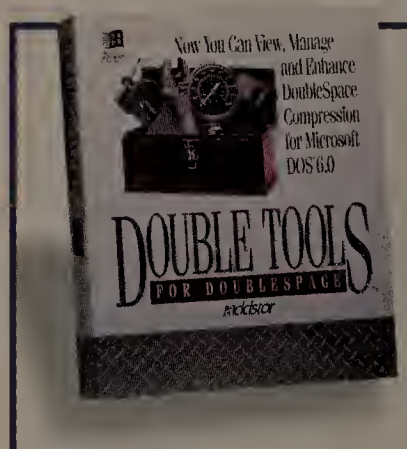


DeltaPoint
3435 *Graphics Tools! for Windows (3½" only)*—Organizes your graphics in a drag & drop thumbnail viewer, convert files, autotrace, image editing, painting, screen capture, 700 pieces of clip art and dozens of photos **$99.**

Okidata ... 1 year
5093 OL400 Laser Printer $599. 9590 OL810 Laser $969.
11901 OL830 Plus 1149. 11893 OL850 ..... 1279.
Pacific Data ... 60 day MBG
5729 ProTracer *(personal CAD printer) (1 yr.)* ..... 1099.

ACCESSORIES

American Power ... 2 years
3819 Back-UPS 250.. 115. 3858 Back-UPS 400.. 179.
7107 Back-UPS 450.. 215. 7105 Smart-UPS 600.. 439.
Curtis ... lifetime
7358 Command Center SPF-4 ..... 79.
Cyrix Corporation ... 5 years
9909 83D87-40 ..... 77. 9876 83D87-33 ..... 65.
Intel ... 3 years
4750 80387SX 79. 5409 80387DX 85. 6569 80387SL 79.
Kensington Microware ... 1 year
Full line available. Partial listing.
4973 Power Tree 20 24. 7060 MicroSaver Security Sys. 39.
2582 MasterPiece Plus..... 95. 2587 Remote ..... 105.
PC Power & Cooling ... 2 years
9537 CPU Cooler *(for 386/33 up to 486)* ..... 29.
3203 Turbo Cool 200 149. 7915 Turbo Cool 300 159.
Targus ... lifetime
7369 Notepac 35. 1305 Univ. Notebook Computer Case 69.
Tripp Lite ... 2 years
6199 Isobar 4-6 *(4 outlets, Gold Seal Warranty)* ..... 43.
6200 Isobar 6-6 *(6 outlets, Gold Seal Warranty)* ..... 49.
5550 BC250 Battery Backup.. 119. 9312 BC500 ... 219.



SPECIAL OFFER WITH MS-DOS 6.0!

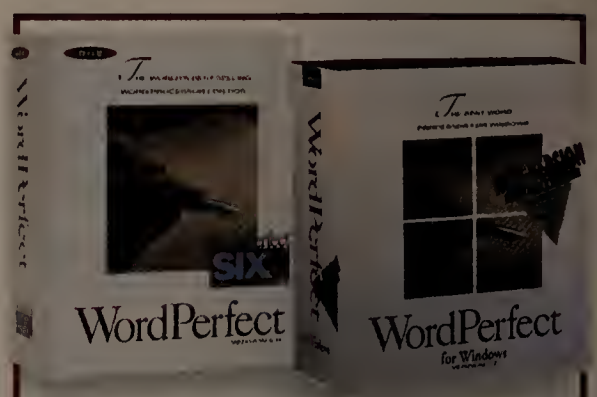
AddStor
12029 *Double Tools*—For DoubleSpace compression. Visualize drives w/graphic displays, manage compressed data easily, archive, share or communicate compressed data **$65.**
3434 *Double Tools w/purchase of DOS 6.0* **49.**

DRIVES

Colorado Memory Systems ... 1 year
4354 Jumbo 250 Tape Backup ..... 215.
1073 Trakker 250 Tape Backup *(parallel)* ..... 429.
Conner Peripherals ... 1 year
2339 CP30104H 120 MB IDE HD *(19 ms)* ..... 199.
1337 CP30204 210 MB IDE HD *(16 ms)* ..... 256.
IOMEGA ... 1 year
6499 Transportable 90 PRO ..... 659.
10452 Transportable MultiDisk 150 ..... 849.
6344 PC Powered 90 PRO 599. 10537 PC Power. 150 799.
2530 90 MB Cartridge..... 149. 2467 Tripak ..... 379.
8480 Tape250 Insider Tape Backup ..... 199.
8481 Tape250 Inside Half-Height Tape Backup ..... 209.
10702 Tape250 Parallel Port Tape Backup ..... 429.
NEC ... 2 years
6582 CDR74-1 CD-ROM Drive ..... 629.
6581 CDR84 Internal CD-ROM *(reqs. interface)* ..... 449.
Quantum ... 2 years
4735 Hardcard EZ 127 MB IDE *(17 ms)* ..... 249.
4714 Hardcard EZ 240 MB IDE *(16 ms)* ..... 399.
TEAC ... 1 year
6951 1.2 MB Drive for AT 55. 7371 1.44 MB Drive 45.
4414 3.5"/5.25" Dual Floppy Drive ..... 145.

MEMORY

1411 1 MB x 9 SIMMs *(70 nanosecond)* ..... call
3702 4 MB x 9 SIMMs *(60 ns)* 2497 4 MB x 9 *(80 ns)* call
5746 1 MB Chips *(80 nanosecond, set of 9)* ..... call
Boca Research ... 5 years
7150 BOCARAM/AT PLUS *(2 MB)* ..... 169.
6998 I/O Board for AT.. 49. 6999 for PS/2 ..... 89.
Pacific Data ... lifetime/60 day MBG
7959 4 MB Upgrd. for LaserJet 4 or 7960 8MB Upgrd. call



WordPerfect Corporation
6227 *WordPerfect Competitive Upgrade*.. **$99.**
4795 *WordPerfect Version Upgrade* ..... **79.**
3497 *WordPerfect 5.2 for Windows* ..... **279.**
6274 *WordPerfect 6.0 DOS Version Upgrade* **99.**
3795 *WordPerfect 6.0 DOS (3804 5¼")* .... **279.**

DISKS/MEDIA

BASF
11875 3.5" HD Disks *(10)*..... 12. 11873 DC2120 .... 19.
Fuji ... lifetime
11790 3.5" HD Disks *(10)*..... 13. 2241 *(50)* ..... 58.
4863 3.5" HD Disks *(20)* with storage case ..... 24.
5692 3.5" HD Preformatted Disks *(20)* w/storage case 25.
Kao
11870 3.5" HD Disks *(10)*..... 12. 11869 *(30)* ..... 35.
11867 3.5" HD Disks *(50)* ..... 50.
Sony ... lifetime/2 years
3292 5.25" HD Disks *(10)* ..... 11.
3298 3.5" HD Disks *(10)* 13. 6375 *(30)* ..... 37.
6495 3.5" HD Disks *(50)* 50. 11871 *(100)* ..... 95.
1603 DG60M *(2 yr.)* ..... 15. 2520 DG90M *(2 yr.)* ... 19.
8185 QD2040 *(2 yr.)* .... 14. 1895 QD2120 *(2 yr.)*.. 19.
3M ... lifetime
1581 DC2120 Tape Cartridge ..... 22.
11013 DC2120 Tape Cartridge *(3 pack)* ..... 60.
Toshiba ... lifetime
4858 3.5" 2.88 MB ED Disks *(5)*... 17. 9755 *(10)*.. 29.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax, except Ohio residents (please add applicable tax).
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail.
- International orders U.S. $100 minimum. Manufacturer support and upgrade eligibility may be limited outside the U.S.A.
- Upon receipt and approval, personal and company checks clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to approval.
- COD max. $1000. Cash or cashier's check. COD orders require an additional $4.50 charge. COD orders ship via UPS and may require additional UPS charges.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices and promotions subject to change without notice (e.g. SIMMs).
- Order lines opened continuously from 8 a.m. Monday until 5 p.m. Sunday ET. Business offices at 603-446-3383 Monday through Friday 9 a.m. to 5:30 p.m. ET.

SHIPPING

Continental U.S.: The total freight charge on any order placed with PC Connection is only $5. Barring events beyond our control, all credit card orders (no COD orders) phoned in weekdays by 3 a.m. ET will ship Airborne Express for delivery the next business day. Which means *same day* delivery for orders placed between midnight and 3 a.m. ET. (Some orders may ship by UPS Ground for next day delivery). Saturday delivery available to many areas upon request at no additional charge. Order all day Saturday through noon on Sunday for Monday delivery. (Some areas require an additional day delivery).
Hawaii, Alaska, Canada, Puerto Rico and the U.S. Virgin Islands: Shipping to these areas may require additional time and charges. Call 800-800-0003 for information.
All other areas: Please call 603-446-0003 or FAX 603-446-7791 for information.

THE FASTEST SHIPPING IN THE PC UNIVERSE

Just $5 TOTAL no matter what!

I. Everything Overnight®. We ship every credit-approved order overnight* for just $5. No matter how many products you order or what they weigh. So when comparing prices make sure you check the total DELIVERED price.

II. Order by 3:00 a.m. That's right. You can actually phone in an order by 3:00 a.m. and it will go out that night via Airborne Express.*

III. Weekend Shipping. No additional charge. Friday orders (until 3:00 a.m. Saturday) are delivered Saturday. Orders placed all day Saturday through noon Sunday arrive Monday.* The total charge is still only $5.

IV. Toll-Free Tech Support. If you ever have a question about anything you buy from us, please call toll free.

V. One-Minute Mail Order™. Once you're a customer, we use Caller ID to access previous ordering information so you can place your order in record time! (We can block this at your request.)

VI. Hold the foam! We pack our orders with a recycled packing paper made in New Hampshire from used 4-color magazines and catalogs. No foam peanuts here!

VII. PCTV® Our weekly half-hour show is the fast and efficient way to keep up with the latest PC products and industry news. Call 800-800-6914 to find out where to see it in your area.

PC World Class Award
Best Mail Order Company
1990, 1991, 1992

*Airborne's overnight service is available *almost* everywhere in the continental U.S.

PC Connection® 800-998-0003

COPYRIGHT 1993 PC CONNECTION, INC. PC CONNECTION, EVERYTHING OVERNIGHT, AND THE RACCOON CHARACTER(S) ARE REGISTERED TRADEMARKS AND ONE-MINUTE MAIL ORDER IS A TRADEMARK OF PC CONNECTION, INC., MARLOW, NH.

COMPAQ

Contura '486

as low as **$2199**

Now Everyone Can Afford To Take 486SL Power On The Road.

Winner of *PC Laptop Computers Magazine* first-ever "Value Award", Contura notebook computers offer the most affordable way to take full-powered computing on the road. The 486 models listed here feature the energy-efficient 486SL processor which has an internal cache and integrated numeric coprocessor for full 486DX performance. And the new 4/25CX has a dazzling CRT-quality active-matrix color display with a built-in EasyPoint Trackball.

Contura Features:

- 3.5" 1.44 MB floppy drive
- NiMH Battery Pack (4/25CX) for 2-3 hours of life; Enhanced NiCd Battery Pack (4/25) for 3-4 hours of life
- MS-DOS and Windows 3.1
- Ports: parallel, serial, external VGA, external numeric keypad, external keyboard/mouse
- 8.9"D x 11.7"W x 2.1"H/6.7 lbs (4/25 CX)
- 8.9"D x 11.7"W x 1.9"H/6.2 lbs (4/25)

Pre-Installed Software!

Purchase any of the following programs with your Compaq and we'll load them at no extra charge! And, while we're at it, we'll even install and de-compress Windows—saving you a good chunk of valuable time. Your machine will arrive totally ready to run.

Microsoft
2931 MS Access for Windows 1.1 ... $299.
7811 MS Word for Windows ..... 299.
5680 MS Excel for Windows ..... 299.
8423 MS PowerPoint ..... 299.
2735 MS Works for Windows ..... 129.
8138 MS Office for Windows ..... 449.
4348 MS Works ..... 95.

WordPerfect
3497 WordPerfect for Windows ..... 279.
3795 WordPerfect for DOS 6.0 ..... 279.
7582 WordPerf. Presentations ..... 279.

Borland
10710 Paradox for Windows ..... 129.
10616 Quattro Pro for Windows ..... 95.
11915 Office for Windows ..... 395.

Lotus
12786 Organizer for Windows ..... $79.
12740 1-2-3/Windows Rel .4 ..... 259.
12742 AmiPro for Windows ..... 199.
12785 Freelance for Windows ..... 289.
12788 SmartSuite for Windows ..... 375.

Aldus
4247 PageMaker ..... 499.

Delrina
10936 WinFax PRO 3.0 ..... 60.

Crosstalk
5611 Crosstalk for Windows ..... 119.

Symantec
2360 Norton Desktop/Windows ..... 115.

Application Techniques
10950 WinDings – *free with any other pre-installed software listed above.*

Contura 4/25CX Color (Active Matrix)

8.4" screen; 256 colors in 640 x 480
25-MHz 486SL; 4MB expandable to 20 MB

11415 **Model 209/w** 209 MB Hard Drive, 8K Cache, Built-in EasyPoint Trackball, NiMH Battery **$3399**

Contura 4/25 Monochrome

9.5" screen, 16 Gray Scales at 640 x 480
25-MHz 486SL; 4MB expandable to 20 MB

11420 **Model 209/w** 209 MB Hard Drive, 8K Cache, Compaq Trackball, NiCD Battery **$2199**

Additional Hardware/Accessories*
No additional charge for installation (where required)

1073 Colorado Trakker 250 Tape Backup (parallel) $429
12357 Kingston 4MB memory upgrade 199
12356 Kingston 8MB memory upgrade 369
10517 Megahertz 2400 data, 9600 S/R fax (int.) 215
10518 Megahertz 9600 data, 9600 S/R fax (int.) 399
10515 Megahertz 14,400 data, 14,400 S/R fax (int.) 419
10648 Compaq NiMH battery 121
10647 Compaq NiCd battery 84
10642 Compaq Auto adapter 112
10646 Compaq External FastCharger 93
10650 Compaq Slipcase 16
7060 Kensington MicroSaver (security device) 39

Note: All Compaq hardware options (drives, modems, etc.) are also available from us. Call for more information.

**We'll install and test the additional hardware or software listed here at no extra charge. And, if you order your customized Compaq any weekday by 10 p.m. ET, we'll still ship it for next-day delivery. With, of course, those same old delicious caveats: Continental U.S. only. Includes Saturday delivery in many locations. Remote locations may require an extra day.*

COMPAQ

ProLinea '486

as low as **$1099**

(monitor not included)

The prices are way down. The speed is way up!

All ProLineas now feature local bus graphics so they're two to five times faster (equivalent to the Dell ME line) *at a better price than ever!* These desktop PCs come complete with **MS-DOS** and **Windows 3.1** ready to run, and we'll install and test any of the "Additional Hardware" listed below or the software on the opposite page at no extra charge. Order your customized Compaq any weekday by 10 p.m. and we'll still ship it for next-day delivery for only $5.*

ProLinea Features:

- Local bus 1024 x 768 video with 1 MB VRAM/256 colors
- The 4/33 is upgradable using OverDrive or VersaChip processors.
- 3.5" 1.44 MB floppy drive
- 101-key keyboard and mouse
- Three 16-bit ISA expansion slots
- 145-watt power supply
- Two serial and one parallel port
- Compact footprint: 15.9"W x 15.1"D x 4.0"H

Monitors

11899	Compaq SVGA 14" Color Monitor	$349
10844	Samsung Sync Master 15" Color Monitor	499
10063	Mag Innovision MX15 15" Color Monitor	599
4249	NEC 4FG 15" Color Monitor	799
10694	Compaq QVision 17" Color Monitor	1146

Additional Hardware

Installed and tested at no extra charge

4194	Colorado Jumbo 120 Tape Backup	$149
4354	Colorado Jumbo 250 Tape Backup	215
10941	Practical Peripherals 2400 data, 9600 S/R internal fax/modem	95
10942	Practical Peripherals 14,400 data, 9600 S/R internal fax/modem	199
6502	Iomega Bernoulli Insider 90 MB PRO	579
6951	Teac 1.2 MB Floppy Drive	55
10744	Kingston 4 MB memory upgrade	179
10743	Kingston 8 MB memory upgrade	395

Note: All Compaq hardware options (drives, modems, etc.) are also available from us. Call for more information.

ProLinea 4/25s

25-MHz 486SX; 4 MB expandable to 32 MB

12166	**Model 120/w** 120 MB Hard Drive	$1099
9549	Model 240/w 240 MB Hard Drive	1299
12168	Model 340/w 340 MB Hard Drive	1449
6418	Intel Overdrive 486SX-25	449

ProLinea 4/33

33-MHz 486DX; 4 MB expandable to 32 MB

12172	**Model 240/w** 240 MB Hard Drive	$1659
12164	Model 340/w 340 MB Hard Drive	1799
8943	Intel Overdrive 486DX-33	569

ProLinea 4/50

50-MHz 486DX2; 4 MB expandable to 32 MB

10893	**Model 240/w** 240 MB Hard Drive	$1899
10894	Model 240/w+ 240 MB Hard Drive, PFS WindowWorks, 5 1/4" Drive, Modem (2400 data, 9600/4800 S/R fax), Prodigy	1999

ProLinea 4/66

66-MHz 486DX2; 4 MB expandable to 32 MB

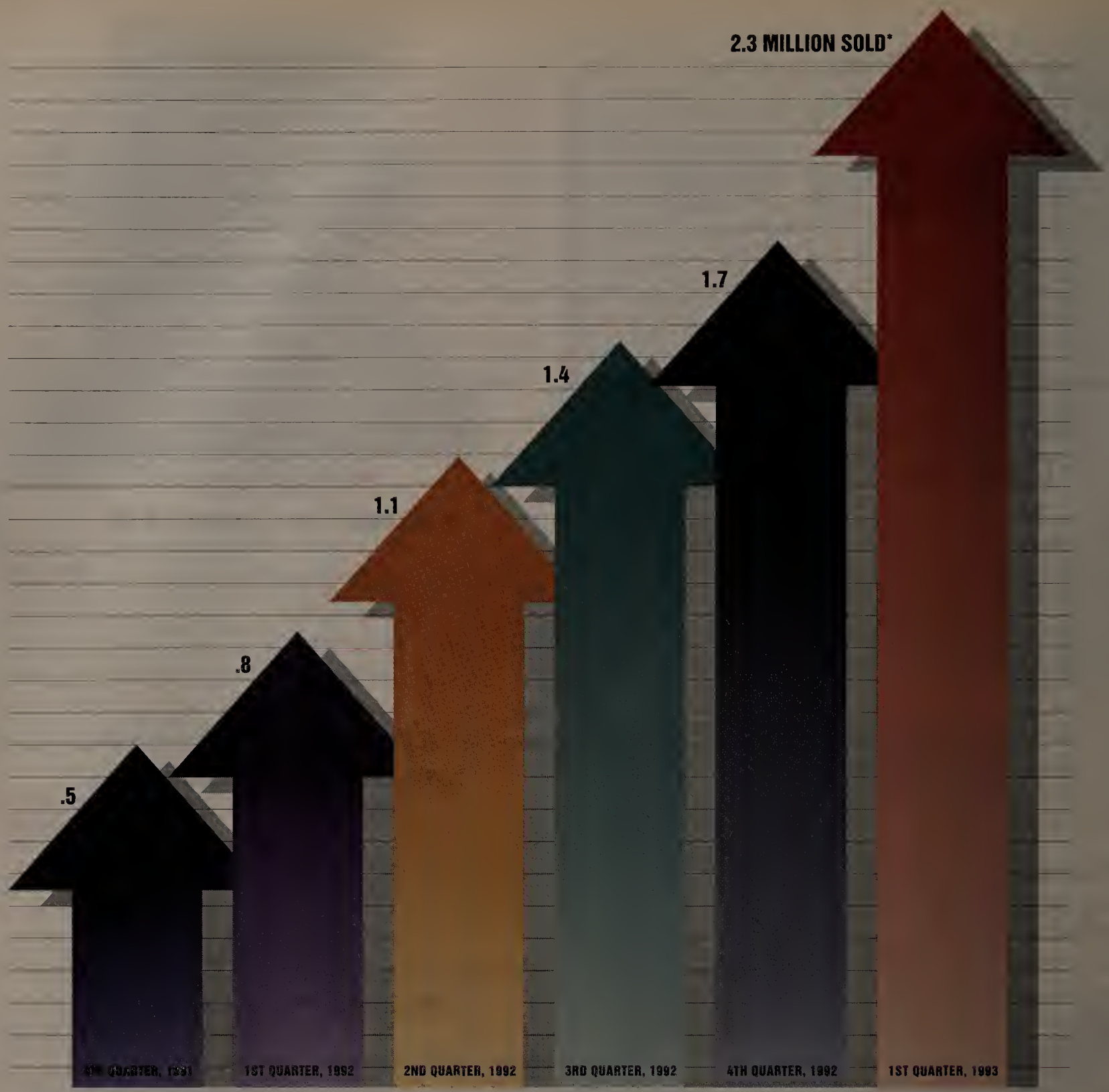
12176	**Model 340/w+** 340 MB Hard Drive, PFS WindowWorks, 5 1/4" Drive, Modem (2400 data, 9600/4800 S/R fax), Prodigy	$2299

We have DESKPRO Models too!

12174	DESKPRO 4/33i Model 240/n: 33-MHz 486DX, 240 MB Hard Drive, DOS, Windows 3.1, Mouse, Ethernet NIC	$2079
12157	DESKPRO 4/66i Model 340/w: 66-MHz 486DX2, 340 MB Hard Drive, DOS, Windows 3.1, Mouse	2499
11646	DESKPRO 4/66M Model 510/w: 66-MHz 486DX2, 510 MB Hard Drive, DOS, Windows 3.1, Mouse, QVision Video, Business Audio	3619

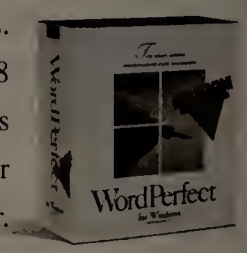
**Here's that fine print again: Continental U.S. only. Includes Saturday delivery in many locations. Remote locations may require an extra day.*

PC CONNECTION COMPAQ HOTLINE 800-998-0003



APPARENTLY, WORDPERFECT® REALLY IS THE WINDOWS WORD PROCESSOR EVERYONE HAS BEEN WAITING FOR.

People learned to like Windows. But with WordPerfect®5.2 for Windows, it's definitely love at first sight. Not only has no software product — not even Windows itself—ever sold more at the start. With 51.2% of first-quarter sales, it's now the biggest selling Windows word processor. What's more, WordPerfect 5.2 for Windows offers advanced new features like Grammatik® 5 (the #1 grammar tool), Adobe Type Manager (with 12 new fonts) and DDE and OLE support. Powerfully improved zoom edit and drag-and-drop. As well as innovations you'll find nowhere else: QuickFinder, a versatile indexing and text retrieval system, mail enabling, QuickMenu, a one-click short-cut to Button Bars,™ and ExpressDocs, for automating documents or forms. But we haven't forgotton what's made us the sales leader. Release 5.2 is still fully file-compatible with WordPerfect 5.1 for DOS and Windows. And it's still backed by the best toll-free support in the business. So call WordPerfect today at (800) 526-5198 for details, or to order the ExpressDocs upgrade for your previous version. Better yet, just visit your favorite local reseller.



WORDPERFECT IS A REGISTERED TRADEMARK AND BUTTON BAR IS A TRADEMARK OF WORDPERFECT CORPORATION WITHIN THE UNITED STATES AND OTHER COUNTRIES. ALL OTHER BRAND AND PRODUCT NAMES ARE TRADEMARKS OR REGISTERED TRADEMARKS OF THEIR RESPECTIVE COMPANIES. © WORDPERFECT CORPORATION 1993. *SOURCE: FIGURES ARE BASED ON WORDPERFECT CORPORATION'S ANALYSIS OF SPA AND WORDPERFECT DATA

WordPerfect®

FINDING THE PERFECT TOUCH

Increased reliance on PCs–and a rash of computer-related repetitive strain injuries–inspire a new generation of input devices. Here's a guide to the latest keyboards, mice, and trackballs.

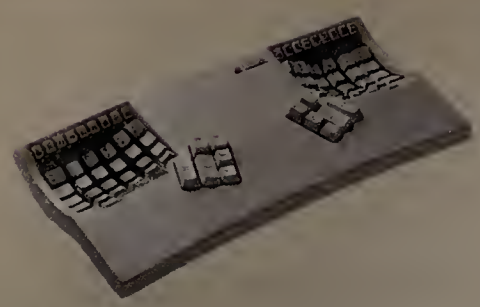
MICHAL VENERA

By Michael Desmond

Imagine a computer upgrade that can increase productivity, improve morale, and possibly save thousands of dollars in medical bills and lost time. It's not a new CPU or second hard disk. In fact, the upgrade involves some of the most basic—and long overlooked—PC components: keyboards, mice, and trackballs.

Input devices for the PC have long been regarded as secondary equipment. Users have been too busy keeping up with the latest processor or must-have application to give serious thought to keyboards and mice. But as office workers rely increasingly on computers, the performance and comfort of these devices assume new importance.

Why? Put simply, the design and suitability of the input device will affect productivity. An uncomfortable keyboard, mouse, or trackball can make even the



Keyboards

● = Yes ○ = No
n/a = not applicable

Manufacturer	Product	Price	STANDARD FEATURES: Number of keys	Programmable	Special keys	PS/2 adapter	LED indicators	FUNCTION KEYS: Number	Position
Advance Computer Ergonomics 619/525-1555	The Natural	$250	101	●	○	●	○	12	top
Alps Electric 408/432-6000	FDMC-101 Mechanical	$39	101	○	○	●	○	12	top
	FDMM-101 Membrane	$29	101	○	○	●	○	12	top
	GGMC-101 Mechanical	$65	101	○	○	●	○	12	top
	MDS-101 Membrane	$38	101	○	○	●	○	12	top
Cherry Electrical Products 708/662-9200	G81-1800 Compact Keyboard	$124	101	○	○	○	○	12	top
Electrone 303/757-0335	4000	$99.99	101	○	○	optional	●	12	top
	6142	$99	142	●	●[3]	optional	●	36	dual
	6200	$68.99	84	○	○	optional	●	12	top
Ergonomic-Interface Keyboard Systems 619/454-0000	The Vertical	$299	101	●	●	●	●	12	dual
Focus Electronic 909/468-5533	KeyPro FK-9000	$79	129	●	●[3]	○	●	24	dual
Fujitsu Microelectronics 408/922-9000	FKB4700 Series	$57	101	○	○	optional	●	12	top
	FKB4870 Series	$36	101	○	○	optional	○	12	top
Health Care Keyboard 414/253-6333	Comfort Keyboard System	$795	103	●	●[3]	●	●	12	top
Honeywell Keyboard Division 915/544-5511	101WN	$79	101	○	●	○	○	12	top
Keyboard Advances 515/472-0353	Erase-Eaze	$72	101	○	●[6]	●	●	12	top
Key Innovations 612/724-7745	TE2P Touch Edit Keyboard	$120	109	○	●[6]	○	●	12	top
	TTE Touch Edit Keyboard	$99	109	○	●[6]	○	●	12	top
Key Tronic 509/928-8000	Trak101 Keyboard	$224	101	○	●[7]	○	●	12	top
	Flash101 Keyboard	$98	101	●	●[8]	○	●	12	top
Kinesis 206/455-9220	Kinesis Ergonomic Keyboard	$690	86	●	●[3]	●	●	17	top
Lexmark Int'l 800/438-2468	Lexmark Classic Touch[10]	$149	101	○	○	●	●	12	top
Marquardt Switches 315/655-8050	MiniErgo	$179	84	●	○[6]	●	●	12	top
Maxi Switch 602/294-5450	ProKey 124 Keyboard	$99	124	●	●[3]	optional	○	22	dual
MicroSpeed 510/490-1403	Keyboard Deluxe–Membrane	$64.95	101	○	○	●	●	12	top
	Keyboard Deluxe–Tactile	$84.95	101	○	○	●	●	12	top
Northgate 612/943-8181	OmniKey/Ultra-T Keyboard	$129	116	●	○	optional	●	24	dual
People & Profits 612/452-8018	VersaKey	$395	175	●	●[12]	optional	●	12	dual
Sal Systems and Laboratories 203/929-0790	Focus 2001	$49	101	○	○	○	●	12	top
Sejin America 408/980-7550	J.M. Keyboard	$99.95	101	○	○	○	○	12	top
SIIG 800/927-8688	Suntouch 101 Enhanced Keyboard	$79	101	○	○	○	●	12	top
	Suntouch Jr.	$69	81	○	●[3]	○	●	12	top
Tony[14] 808/599-8669	The Tony Ergonomic KeySystem	$625	101	●	●[15]	●	○	12	optional

[1] Adjustable or split keyboard.
[2] Integrated trackball on keyboard.
[3] User-definable macro/function keys.
[4] Adjustable frame; dimension differs by settings.
[5] Vertical typing surface with adjustable sections.
[6] Centrally positioned edit key(s).
[7] Mouse control keys.
[8] Function viewing keys.
[9] Separate, concave keywells.
[10] Two models, with built-in 16mm or 25mm trackball.
[11] Three-position tilt, low-profile design.
[12] 60 user-definable macro buttons at top of keyboard.

DESIGN ELEMENTS

Height (inches)	Width (inches)	Depth (inches)	Integrated input device	Ergonomic features	L-shaped <Enter> key	Warranty (years)	Reader service number
0.8	20	9	○	●[1]	●	2	697
1.6	18.1	6.7	○	○	●	1	698
1.6	18.1	6.7	○	○	●	1	698
1.6	18.6	8.4	○	○	○	3	698
1.7	18.9	7.5	○	○	○	3	698
1.4	15.9	7.1	○	○	○	1	699
2.8	18.5	7.5	●[2]	○	●	1	700
2	20.5	8.5	○	○	●	1	700
1.5	12.8	6.3	○	○	●	1	700
7	17[4]	7	●	●[5]	●	2	701
1.8	21	7	○	○	●	1	702
1.1	19.1	8.7	○	○	○	1	703
1	18.4	6.9	○	○	○	1	703
2.5	22	6.3	○	●[1]	○	2.5	704
1.7	18.5	7.3	○	○	●	3	705
1.6	18.2	6.8	○	○	●	2	706
2	19	9	○	●	○	1	707
2	19	9	○	●	○	1	707
1.8	19	8.1	●[2]	●	●	3	708
1.9	18.4	8.3	○	●	●	2	708
3	16.5	8	○	●[9]	○	3	709
1.7	19.4	8.3	●[2]	○	○	1	710
2	17.8	9.8	○	●[1]	●	90 days	711
1.6	20.2	8.1	○	○	●	3	712
1.7	15.8	6.7	○	●[11]	●	1	713
1.7	15.8	6.7	○	●[11]	●	1	713
2.6	20.6	8.1	○	○	●	5	714
1.5	20.4	8.3	○	○	●	1	715
1	19	7.5	○	○	●	1	716
1.6	18.2	6.6	●[13]	○	●	3	717
1.5	19	7.8	○	○	●	1	718
1.5	12	6	○	○	●	1	718
[4]	[4]	[4]	●	●[1]	●	3	719

[13] Sensors under J key let it double as pressure-sensitive input device.

[14] Available this month, according to manufacturer.

[15] All keys adjustable in three dimensions.

For more information about all products in this table, circle reader service no. 904.

simplest task a chore. Whether you're struggling with a cramped or unresponsive keyboard or fumbling with a hard-to-reach mouse button, the extra effort slows you down significantly.

But the argument for taking a new look at these devices goes beyond day-to-day productivity. Increased reliance on computers has contributed to a stunning rise in repetitive strain injuries among U.S. workers (see "Danger at Your Fingertips," May). While a minor annoyance—such as having to twist your wrists to get your fingers across a keyboard—may not seem threatening, repetition of that action can take a real toll on joints, tendons, and muscles.

So it's hardly surprising that a new crop of input devices is springing up. After years of research, ergonomic designs offering adjustable fit, contoured surfaces, and a variety of hand positions are reaching the market.

For all the variety and innovation, one rule stands firm: There is no substitute for testing. For corporate users that means setting up trial programs and running in-house usability tests. Individuals should try as many products as possible before buying. Also, look for a 30-day return policy so you can return a product if it doesn't work out.

Needless to say, the plethora of options and issues can get confusing. To give you a place to start, we've laid out important buying guidelines and rounded up keyboards, mice, and trackballs from a number of vendors to help you pick the right product.

Keyboards Stray Into New Territory

Nowhere is the new ergonomic thinking more dramatic than among keyboards. From designs that merely divide the keyboard into two parts to wildly adjustable multisection keyboards, new products are transforming the model established by IBM. But for all their variety, most new designs share two goals: Reduce finger travel and eliminate wrist strain.

Standard keyboards force users to lay their hands flat and twist their wrists inward when typing, an unnatural position called wrist pronation. Many designs seek to reduce this strain by splitting the keyboard and angling the sides outward, letting the hands rest in a natural handshake position that takes the strain off local muscles and tendons. Other designs, such as Keyboard Advances' Erase-Eaze and the Key Innovations TTE Touch Edit Keyboard, seek to

WHY BUY JU
COMPUTER WHEN
COMPAQ AT PRIC

All our PCs are backed by the COMPAQ free 3-year warranty†—the first such warranty in the industry. We can offer this kind of long-term guarantee because of our quality and testing standards. Prices include COMPAQ Monitors. Call for details on other COMPAQ desktops and notebooks, as well as printers.

COMPAQ ProLinea 3/25s
25-MHz 386SX, 2-MB RAM, 120-MB hard drive, VGA Color Monitor. An affordable entry-level desktop PC.

†Restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. *Leasing is provided by GE Capital Corporation for a term of 36 months, and is subject to approved c
Registered U.S. Patent and Trademark Office. Contura and ProLinea are trademarks of Compaq Computer Corporation. COMPAQ DirectPlus and CompaqCare are service marks of Compaq Computer Corporation. Products, prices and
of Microsoft Corporation. The Intel Inside Logo is a trademark of Intel Corporation.

ST ANOTHER YOU CAN GET A ES LIKE THESE?

COMPAQ ProLinea 4/25s
25-MHz 486SX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. Great for everyday business applications.

COMPAQ ProLinea 4/33
33-MHz 486DX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. Designed for more advanced applications.

COMPAQ ProLinea 4/66
66-MHz 486DX2, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. For high performance at an affordable price.

ProLinea Features

3½" 1.44-MB diskette drive ◆ 1024 x 768 local bus video graphics with 1-MB VRAM in up to 256 colors (on 486 models) ◆ 3 expansion slots ◆ 3 internal storage device positions ◆ Security features ◆ COMPAQ Color Monitor, preinstalled MS-DOS 6.0 and Microsoft Windows 3.1 and a COMPAQ Mouse.

DESKPRO/i Features

*3½" 1.44-MB diskette drive ◆ Integrated QVision Graphics displays up to 256 colors at 1024 x 768 with 512-KB VRAM option** ◆ 3 expansion slots ◆ 3 internal storage device positions ◆ Security features ◆ Business Audio ◆ COMPAQ Color Monitor, preinstalled MS-DOS 6.0, Microsoft Windows 3.1 & Sound System Software, COMPAQ Mouse & Microphone.*

COMPAQ DESKPRO 4/25is
25-MHz 486SX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. Delivers fast, high-resolution graphics in Windows.

COMPAQ DESKPRO 4/33i
33-MHz 486DX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. For even faster performance in a Windows environment.

intel inside

Contura Features

3½" 1.44-MB diskette drive ◆ Power conservation and security features ◆ Battery Pack ◆ AC Adapter ◆ Preinstalled MS-DOS 6.0, Microsoft Windows 3.1 and EZ Help On-Line Library and a COMPAQ Trackball.

COMPAQ Contura 3/25
25-MHz 386SL, 4-MB RAM, 120-MB hard drive, monochrome VGA display, 6.2 lbs. An affordable notebook loaded with features.

COMPAQ Contura 4/25
25-MHz 486SL, 4-MB RAM, 120-MB hard drive, monochrome VGA display, 6.2 lbs. Upgradeable to Active Matrix Color Display.

COMPAQ DirectPlus

1-800-888-0182

certain terms and conditions. Call for details **Requires a 1024 Color Monitor. ©1993 Compaq Computer Corporation. All rights reserved. Printed in the USA. Compaq, the COMPAQ logo and DESKPRO
ns are subject to change without notice. All products are trademarks or registered trademarks of their respective companies. Microsoft and MS-DOS are registered trademarks, and Windows is a trademark

Circle 83 on reader service card

Time Is
And Calling Co
Can Save

We've put together these bundles to make it easy to get the hardware and software that you need in a complete system, at one special price. No matter what your computing needs, chances are that one of these bundles will fit the bill. Not only that, but the price you'll pay will fit well within your budget.

The Basics Plus.

COMPAQ ProLinea 4/25s
25-MHz 486SX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor.

Data+Fax Modem

WinFax PRO for Windows

Microsoft Works for Windows

Calendar Creator Plus Windows

AfterDark for Windows

Quicken for Windows

This entry-level system gives you a full range of business and personal applications as well as data and fax communications—all at a surprisingly low price.

$1,599

*Or $57 per month**

Save over $228†

*Leasing is provided by GE Capital Corporation for a term of 36 months, and is subject to approved credit and certain terms and conditions. Call for details. ©1993 Compaq Comp Compaq Computer Corporation. COMPAQ DirectPlus is a service mark of Compaq Computer Corporation. Products, prices and programs are subject to change without notice Corporation. The Intel Inside Logo is a trademark of Intel Corporation. †Savings based on individual prices.

MONEY.
MPAQ DIRECTPLUS
YOU BOTH.

The Front Office.

COMPAQ ProLinea 4/33
33-MHz 486DX, 4-MB RAM,
120-MB hard drive,
SVGA Color Monitor.

Quattro Pro for Windows

WordPerfect for Windows

This general business solution, which is offered to you at a very competitive price, teams up two popular word processing and spreadsheet applications.

$1,899
*Or $68 per month**
Save over $274†

The Windows Office.

COMPAQ DESKPRO 4/33i
33-MHz 486DX, 4-MB RAM,
240-MB hard drive,
1024 Color Monitor.

Extra 2-MB of RAM

The Microsoft Office for Windows

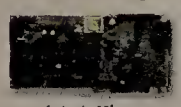
This solution can utilize COMPAQ business audio with the most popular Microsoft applications. The Microsoft Office includes Microsoft Excel, Word, PowerPoint and Mail.

$2,699
*Or $97 per month**
Save over $239†

The Office Pro.

COMPAQ ProLinea 4/50
50-MHz 486DX2, 4-MB RAM,
240-MB hard drive,
SVGA Color Monitor.

Extra 4-MB of RAM



14.4-Kbps Data+Fax Modem

WinFax PRO for Windows

Lotus SmartSuite for Windows

This solution offers data and fax communications with popular Lotus applications. Lotus SmartSuite includes Lotus 1-2-3, AmiPro, Freelance Graphics, Organizer and cc:Mail.

$2,899
*Or $104 per month**
Save over $279†

intel inside™

COMPAQ DirectPlus

1-800-888-0182

poration. All rights reserved. Printed in the USA. Compaq, the COMPAQ logo and DESKPRO Registered U.S. Patent and Trademark Office. ProLinea is a trademark of
ducts are trademarks or registered trademarks of their respective companies. Microsoft and MS-DOS are registered trademarks, and Windows is a trademark of Microsoft

Circle 83 on reader service card

Mice

● = Yes ○ = No
n/a = not applicable

Manufacturer	Product	Price	KEY FEATURES: Number of buttons	Base resolution (dpi)[1]	Dynamic acceleration	Adjustable speed/ sensitivity	DESIGN ELEMENTS: Ergonomic features	Operating mechanism
A4Tech 909/468-0071	3-Button Serial Mouse	$35	3	300	○	○	n/a	optomechanical
Altra 307/328-1342	Felix	$118	2	330	○	●	pen-shaped	mechanical
Appoint 510/463-3003	MousePen Pro	$99	2	150	●	●	pen-shaped[2]	optomechanical
	Gulliver	$119	2	150	●	●	very small	optomechanical
Commax 908/671-0775	City Mouse	$17	4	360	●	●	n/a	optomechanical
DFI 916/568-1234	DMS-400x	$29	3	400	○	○	contoured	optomechanical
DynaPoint 818/854-6440	DynaMouse	$99	2	400	●	●	n/a	mechanical
Focus Electronic 909/468-5533	Alum Mouse	$25	3	400	●	●	n/a	optomechanical
Honeywell Keyboard Division 915/544-5511	Honeywell Mouse	$79	2[3]	320	●	●	n/a	optomechanical
IMSI 800/833-4674	IMSI Mouse	$69.95	3	290	●	●	contoured	optomechanical
	Pet Mouse	$39.95	3	290	●	●	contoured	optomechanical
	System Mouse	$29.95	3	290	●	●	contoured	optomechanical
KYE Int'l 909/923-3510	Genius Clixes	$29.95	3	350	●	●	n/a	optomechanical
	Genius MouseOne	$19.95	3	350	●	●	n/a	optomechanical
	Genius MouseToo	$44.95	3	350	●	●	n/a	optomechanical
Logitech 510/795-8500	MouseMan Cordless[4]	$149	3	400	●	●	contoured[5]	optomechanical
	MouseMan [6, 7]	$119	3	400	●	●	contoured[5]	optomechanical
Microsoft 206/882-8080	Microsoft Mouse 2.0	$109[8]	2	400	●	●	contoured	optomechanical
MicroSpeed 510/490-1403	Mouse Deluxe	$34.95	3	500	●	●	low profile	optomechanical
Mouse Systems 510/656-1117	Mouse	$24.95	2	350	●	●	n/a	optomechanical
	New Mouse	$89.95	3	400	●	●	n/a	optomechanical
	OmniMouse II	$49.95	2	350	●	●	contoured	optomechanical
	PC Mouse III	$129	3	300	●	●	n/a	optical
ProHance 415/967-5774	PowerMouse/100	$175	40[9]	200	●	●	all buttons programmable	optomechanical
	PowerMouse/50	$99	12[9]	200	●	●	all buttons programmable	optomechanical
	PowerMouse/70	$125	17[9]	200	●	●	all buttons programmable	optomechanical
	ProHance Serial Mouse	$39.95	3	50	●	●		optomechanical
Radio Shack 817/390-3011	25-2001 Combi-Mouse	$39.95	2	400	○	●	contoured	optomechanical
Sal Systems and Laboratories 203/929-0790	Aero Plus	$39	3	300	○	●	n/a	optomechanical
Sejin America 408/980-7550	SMC 24	$28.50	2	400	●	○	contoured[5]	optomechanical
	SMC 34	$29.95	3	400	●	○	contoured[5]	optomechanical
SIIG 510/657-8688	MouseTrax	$69	3	200	●	●	dual mouse/trackball	optomechanical
Winner Products (USA) 909/595-2490	RM-2[11]	$69.95	2	400	○	●	n/a	mechanical
Zeny Computer Systems 510/659-0386	Zen Infra-red Cordless Mouse[11]	$89	3	200	●	●	contoured	optomechanical
Moustrak 702/884-1925	Colani Mouse[6]	$79	3	400	●	●	contoured	mechanical
	Win Mouse	$16.99	2	300	●	●	n/a	mechanical

[1] 600 dpi along z-axis.
[2] Dual mouse/trackball.
[3] Also available in 3-button model.
[4] Radio-transmitting mouse.
[5] Finger grooves on buttons.
[6] Left- and right-handed versions.
[7] Large size available.
[8] Prices vary for different bus types.
[9] Two true mouse buttons, rest for macros.

PORTS					
Serial	PS/2	AT	Bundled software	Warranty (years)	Reader service no.
●	○	●	none	3	720
●	○	○	mouse utility	1	721
●	●	●	desktop utility	1	722
●	●	●	desktop utility	1	722
●	○	○	graphics program	lifetime	723
●	○	○	graphics program, mouse utility	1	724
●	●	○	none	2	725
●	●	●	graphics program, mouse utility	1	726
●	●	●	none	5	727
●	○	●	graphics program, desktop utility	lifetime	728
●	○	○	desktop utility	lifetime	728
●	○	○	none	2	728
●	○	○	none	lifetime	729
●	●	○	none	lifetime	729
●	●	○	graphics program	lifetime	729
●	●	●	mouse utility	3	730
●	●	●	mouse utility	3	730
●	●	●	mouse utility	2	731
●	○	○	mouse utility, keyboard utility	1	732
●	○	●	game	limited lifetime	733
●	●	●	game, graphics program	limited lifetime	733
●	●	●	game	limited lifetime	733
●	●	●	game	limited lifetime	733
●	○	○	mouse utility, macro program	1	734
●	○	○	mouse utility, macro program	1	734
●	○	○	mouse utility, macro program	1	734
●	○	○	mouse/menu utility, graphics program	1	734
●	●	●	none	1	735
●	○	○	mouse/menu utility, graphics program	1	736
●	●	●	mouse utility	3	737
●	●	●	mouse utility	3	737
●	optional	●	graphics program	2[10]	738
●	●	●	mouse/menu utility	1	739
●	○	●	mouse utility	1[10]	740
●	●	●	none	1	741
●	●	●	none	1	741

[10] Limited coverage thereafter.

[11] Infrared transmitting mouse.

For more information about all products in this table, circle reader service no. 905.

reduce finger travel by moving edit keys to a central position near the <Space> bar or within a split home row.

But not all users need a nonstandard keyboard, nor do they want to face the learning curve some of these products require. To add power and functionality to a plain-vanilla keyboard, consider an integrated pointing device or programmable macro keys to streamline many tasks. Lexmark's two Classic Touch keyboard models include an integrated trackball. The VersaKey keyboard from People & Profits adds value through programmability, with 60 keys that can be set to perform tasks such as launching programs and saving files.

All this innovation can get pricey, though, with some of the newer ergonomic options costing $600 or more. Systems that include integrated pointing devices and dedicated macro keys can make typing easier without demanding a high premium.

Training time is an important consideration for buyers evaluating new keyboard designs. While even the most radical split-key models listed here maintain the traditional QWERTY layout, a nonstandard orientation can confound experienced typists for hours if not days.

Pointing the Way to Personalized Computing

Keyboards are only part of the equation. As Windows has gained popularity, the mouse has become a fixture on most PCs, with trackballs and other pointing devices enjoying a lesser following.

When shopping for a mouse or trackball, pay attention to the base resolution. Resolution, usually measured in dots per inch (dpi), indicates how closely the device responds to movement. The higher the resolution, the greater your control. Most mice and trackballs offer standard resolutions between 200 and 400 dpi, with higher values achieved through software enhancements. Even so, 400 dpi is more than adequate for most graphical applications.

All these products include driver software that controls the device and lets it talk to your computer. Make sure yours comes with drivers for DOS and Windows, at a minimum. Many products also include a suite of utilities to change resolution, customize button functions, and program macros. Finally, bundled software packages, such as draw programs, menu enhancers, and other applications, are often included.

We Can Understand Why Other Companies Don't Include A 3 Year Warranty.

(If We Sold Their Compu

In the computer business, the standard warranty is one year. As in twelv
computer and you get a free 3-year warranty.* Buy one of their computers

©1993 Compaq Computer Corporation. All rights reserved. COMPAQ Registered U.S. Patent and Trademark Office. *3-year limited warranty. Certain restrictions and exclusions ap

ters We Wouldn't Either.)

months. 365 days. 8,760 hours. Buy any Compaq
nd you could find yourself counting the minutes.

COMPAQ

nitors, battery packs, peripherals and certain options are covered by a one-year warranty. Call the Compaq Customer Support Center and select the PAQFax option for details.

Circle 35 on reader service card

Trackballs

● = Yes ○ = No
n/a = not applicable

Manufacturer	Product	Price	KEY FEATURES: Number of buttons	KEY FEATURES: Resolution (dpi)	KEY FEATURES: Drag-lock	DESIGN ELEMENTS: Ball diameter (inches)	DESIGN ELEMENTS: Ergonomic features	DESIGN ELEMENTS: Operating mechanism
A4Tech 909/468-0071	First Finger Trackball	$60	3	350	○	1.5	n/a	optomechanical
Appoint 800/448-1184	Thumbelina[1]	$99	2	150	●	0.4	small, hand-held	optomechanical
CH Products 619/598-2518	RollerMouse	$129.95	4	400	●	2.25	contoured	optomechanical
DynaPoint 818/854-6440	DynaTrak[1]	$99	2	250	○	1.15	left/right-handed positioning	mechanical
Electrone 800/821-9362	1601/2	$189	3	200	●	2	palm rest	optomechanical
IMSI 800/833-4674	PC Stylus Combo	$89.95	3	100	●	0.5	pen-shaped stylus	optomechanical
GPS Marconi Circuit Technology 516/293-8686	RB2-300	$155	3	200	●	2.25	n/a	optomechanical
Itac Systems 800/533-4822	Mouse-trak	$179	3	2000	●	2	palm rest	optomechanical
Kensington Microware 415/572-2700	Expert Mouse 4.0 Trackball	$149.95	2	200	●	2.25	n/a	optical
Key Tronic 800/262-6006	TrakMate Wristpad	$149	4[2]	200	●	1.35	wrist-rest/trackball combination[3]	optomechanical
KYE Int'l 800/456-7593	Genius HiTrak	$74.95	3	350	●	1.5	n/a	optomechanical
	Genius HiPoint	$79	2	350	○	1	n/a	optomechanical
Logitech 510/795-8500	TrackMan	$139	3	300	●	1.35	contoured	optomechanical
	TrackMan Portable[1]	$169	3	200	●	1	contoured	optomechanical
Microsoft 206/882-8080	BallPoint Mouse[4]	$165	2	400	●	1.25	adjustable tilt	mechanical encoders
	BallPoint Mouse[1]	$169	4	400	●	1.25	adjustable angle	mechanical encoders
MicroSpeed 510/490-1403	PC-Trac	$119	3	50–1600	●	2.25	low profile	optomechanical
	WinTrac	$129	3	50–1600	●	2.25	low profile	optomechanical
	MicroTrac Model #PD600	$89.95	3	50–1600	●	0.75	index-finger use	optomechanical
Mouse Systems 510/656-1117	PC Trackball II	$99.95	3	680	○	1.5	n/a	optomechanical
	NewPoint	$99.95	2	200	○	1	n/a	optomechanical
ProHance 415/967-5774	ProHance PowerTrack/100	$175	40[6]	200	●	1.75	n/a	optomechanical
	ProHance PS/2 Trackball	$99.95	2	200	○	1.75	n/a	optomechanical
	ProHance Serial Trackball	$79.95	3	200	○	1.75	n/a	optomechanical
Radio Shack 817/390-3011	25-2003 Trackball	$39.99	2	200	●	1	contoured	optomechanical
Winner Products (USA) 909/595-2490	EasyTrak	$69.95	4	200	●	1	left/right-handed versions	optomechanical
	T2+	$49.95	3	400	●	1.75	n/a	optomechanical

[1] Portable.
[2] LED indicators for drag-lock and speed control.
[3] Attaches to base of keyboard.
[4] Comes with desktop stand.
[5] Limited warranty thereafter.
[6] Two true mouse buttons, rest for macros.

Mice

As with keyboards, standard mouse design has evolved in recent years. While most mouse surfaces are curved for comfort and ease of use, many new models offer special contouring, specific sizes, and even separate versions for left- and right-handed use. Again, the key issue is comfort.

The two market leaders, Microsoft and Logitech, take different approaches to comfort. Microsoft Mouse 2.0 features a long, tapered design and a contoured ridge for hand and wrist support, while Logitech's MouseMan comes in right- or left-hand versions. While both companies have spent millions of dollars trying to determine the best shape, aspect, and material for optimal use, no single design works for everybody, so try before you buy.

Beyond comfort lies the Great Button Debate: Most mice come in two- and three-button designs, yet today's software is just beginning to recognize even the second button. The third button remains un-

PORTS					
Serial	PS/2	AT	Bundled software	Warranty (years)	Reader service number
●	○	○	none	3	742
●	●	●	animation program, mouse utility	1	743
●	●	●	mouse utility, menu utility	1	744
●	●	○	none	2	745
●	○	●	none	1	746
●	●	●	cursor utility	3	747
●	●	●	mouse utility	1	748
●	●	●	none	1	749
●	●	●	mouse utility, application detection switching utility	5	750
●	●	●	install utility, game	1	751
●	●	○	graphics program	lifetime	752
●	●	○	none	lifetime	752
●	●	●	mouse utilities	3	753
●	●	●	mouse utilities	3	753
●	●	○	mouse utilities	1	754
●	●	○	mouse utilities	1	754
●	●	●	keyboard utility	1	755
●	○	●	application detection utility, 3-D utility	1	755
●	●	●	keyboard utility	1	755
●	●	●	none	2[5]	756
●	●	●	none	2[5]	756
●	○	○	mouse programming utility, macro program	1	757
○	●	○	graphics program, menu utility	1	757
●	○	○	graphics program, menu utility	1	757
●	●	●	none	1	758
●	●	●	menu utility	1	759
●	○	○	menu utility	1	759

For more information about all products in this table, circle reader service no. 906.

supported in nearly all applications. To fill the gap, some mice include utilities that let you assign cut-and-paste and double-click functions to the second and third buttons.

If your desk is a candidate for disaster relief, a cordless mouse can grant new freedom by untethering you from the PC. Inexpensive infrared models, such as Winner Products' $69.95 RM-2, eliminate the bothersome cord but demand line-of-sight transmission. A radio-based cordless mouse such as Logitech's $149 MouseMan Cordless, on the other hand, can transmit right through a stack of papers and operate a PC from 6 feet away. A word of advice, though: Make sure a radio-controlled mouse has a choice of channels so you can avoid conflict with other cordless mice in the vicinity.

In general, expect to pay between $20 and $120 for a standard mouse and up to $150 for a cordless, radio-operated mouse.

Trackballs

A trackball is essentially a mouse flipped on its back. For this reason, users face many of the same comfort, performance, and quality issues they do with mice. Generally, trackballs are considered a space-saving alternative to mice, providing full cursor mobility even on a crowded desk. For the same reason, they're ideal for portable computing.

When looking for trackballs, pay attention to the size of the ball used to control the screen cursor. A larger ball is likely to give you better control and greater comfort. Equally important is the placement of buttons; a trackball with hard-to-reach buttons can wreak havoc with your hand. Some products, such as DynaPoint's DynaTrak, have adjustable left- and right-handed positioning, and additional ergonomic and user-specific designs abound. As with other input devices, personal preference is key.

While desktop trackballs feature large rollers, stable bases, and well-spaced buttons, the portable versions used with notebooks must function in a confined space. Some products, such as Logitech's TrackMan Portable and Microsoft's BallPoint Mouse, provide control and comfort via a larger chassis that clips onto the side of a notebook. Others, such as Appoint's handheld Thumbelina, concentrate on portability by using a much smaller layout. Personal preference aside, the suitability of a portable trackball often depends on how and where you'll be using your notebook.

While the range of trackball prices—from $40 to $189—closely resembles that of our mouse products, you should generally expect to pay a little more for a trackball.

One Size Doesn't Fit All

In product categories where personal preference reigns supreme, you can never have too many choices. Fortunately, there's no shortage of options when choosing a keyboard, mouse, or trackball. A host of ergonomic designs and integrated products offer features to suit just about every taste.

Michael Desmond is an assistant editor for PC World.

Kowabunga!
intel inside
imagine a family of PCs that turns your idea of

THE DECpc™ FAMILY. ONE BREATHTAKING VALUE AFTER ANOTHER.

	PROCESSOR/PRICE	PACKAGE INCLUDES:
LP SYSTEMS	Low-profile, high performance desktop PCs with built-in local-bus video and GUI acceleration.	
	• **25MHz i486SX** **$1,549** • **33MHz i486SX** **$1,749** • **33MHz i486DX** **$1,999** • **50MHz i486DX2** **$2,149** • **66MHz i486DX2** **$2,449** • **Lease for as low as $54/Month**	• Local bus SVGA video • GUI accelerator • 4MB RAM • 128 KB cache • 512 KB video RAM • 127 MB hard drive • 3 ISA slots • 4 drive bays • OverDrive™ Processor Upgrade • 3.5" floppy drive • 14" VGA color monitor • Pre-installed MS-DOS®/ Windows™ • Mouse • 101-key keyboard
MT SYSTEMS	Compact desktop servers with built-in Windows acceleration and plenty of room for expansion and storage.	
	• **33MHz i486DX** **$2,249** • **50MHz i486DX2** **$2,399** • **66MHz i486DX2** **$2,699** • **Lease for as low as $79/Month**	• Local bus SVGA video • GUI accelerator • 4MB RAM • 128 KB cache • 512 KB video RAM • 127 MB hard drive • 6 ISA slots • 5 drive bays • OverDrive Processor Upgrade • 3.5" floppy drive • 14" VGA color monitor • Pre-installed MS-DOS/ Windows • Mouse • 101-key keyboard
MTE SYSTEMS	The only desktop PC you can get with both EISA and VESA-VL buses.	
	• **33MHz i486DX** **$2,949** • **66MHz i486DX2** **$3,399** • **Lease for as low as $103/Month**	• 6 EISA slots with 1 VESA-VL • Local bus SVGA video • GUI accelerator • 8MB RAM • 128 KB cache • 1MB video RAM • 245 MB hard drive • 5 drive bays • Pentium™ OverDrive Processor Upgrade • 3.5" floppy drive • 14" VGA color monitor • Video adapter • Pre-installed MS-DOS/ Windows • Mouse • 101-key keyboard
SL NOTEBOOKS	Modular notebooks that let you upgrade processors, disk drives, screens and more.	
	• **25MHz i386SL** (mono) **$2,299** • **25MHz i386SL** (color) **$2,899**	• 4MB RAM • 64 KB cache • 120MB removable hard drive • 2 PCMCIA slots • 2 drive bays
	• **25MHz i486SL** (mono) **$2,499** • **25MHz i486SL** (active matrix color) **$3,999** • **Lease for as low as $81/Month**	• 4MB RAM • 120MB removable hard drive • 2 PCMCIA slots • 2 drive bays • 3.5" floppy drive • Pre-installed MS-DOS/ Windows • BitFAX/BitCOM software • 6.5-hour NiMH battery • AC adapter • Snap-on trackball

© DIGITAL EQUIPMENT CORPORATION, 1993. The DIGITAL Logo and DECpc are trademarks of the Digital Equipment Corporation. OverDrive, Pentium and the Intel Inside Logo are trademarks of Intel Corporation. Windows is a trademark and MS-DOS is a registered trademark of Microsoft Corporation. Digital believes that the information in this advertisement is accurate as of its publication date; such information is subject to change without notice. Digital is not responsible for any errors. Actual monitor may differ from that shown. Not all products available worldwide.

France 1-69 87 69 87
Australia 008-021246
Brazil 55-11-492-4195
U.K. 0800-393200
Italy 1678-02075
Mexico 52-5-669-0422
Caribbean 305-360-6500
Germany 0130-7778
Canada 800-267-6215
Asia 852-311-8321
Puerto Rico 809-781-0505 xt 8357
Japan 0120-116004

CALL 1-800-332-4429

8:30 a.m. to 8:00 p.m. Mon.-Fri. ET Please reference BJF when you call.

value on its ear.

digital™

PUTTING IMAGINATION TO WORK

Here's How

Contents: Spreadsheets 242 | Word Processing 248 | Windows 252 |

HELP LINE Q & A

Tip of the Month

CUSTOMIZING DOS HELP: When you enter DOS 6.0's FASTHELP command or DOS 5.0's or 6.0's HELP command without any arguments, DOS displays a summary of commands drawn from the text file DOSHELP.HLP. You can customize the help information DOS gives you by editing or replacing DOSHELP.HLP.

To insert important but elusive facts about commands you look up frequently, find DOSHELP.HLP in your DOS directory, and open the file in any ASCII text editor such as DOS's EDIT or Windows' Notepad.

To extend any command description, type the new information at the end of the description. If you need to add a new line, hit <Enter> to force a carriage return and move over a few spaces before typing so that the command names remain alone in the first column.

You can create edited copies of DOSHELP.HLP in several directories to get help information specific to each directory. If you enter FASTHELP or HELP in a directory that doesn't contain a help file of its own, DOS will display the DOSHELP.HLP that resides in the first directory along the search path set by the PATH command.

James Langdell, Sunnyvale, California

Keyboard Heaven

Q In the January *Dialog Box*, I ran across a program called CLRBUFR-.COM, which clears the keyboard's type-ahead buffer within a batch file. I use a program that moves very slowly, and I sometimes get into trouble by typing too far ahead. Is there a way to create a hot key that clears the keyboard buffer?

I'd also like a program that tells the computer, "Forget whatever it is that caused you to crash and return to what you were doing before the last keystroke I pressed." Am I dreaming.

Nick Jones, Atlanta

A Unbeknownst to most users, every PC already *has* a hot key that clears the keyboard buffer. Pressing <Ctrl>-<Break> at any time causes the PC's BIOS to empty the keyboard buffer. The BIOS then passes <Ctrl>-<Break> to the application. Sometimes <Ctrl>-<Break> terminates an app, but most apps ignore it. If your program doesn't abort when you hit <Ctrl>-<Break>, you can use this key combination to clear the type-ahead buffer.

As for your second request: You may think you're dreaming, but there really *is* a program that does what you have in mind. Working Software's $49.95 Last Resort, a little-known memory-resident utility, remembers every keystroke you type and allows you to play them back later if the system crashes. Thus, it can do more than just recover work you didn't get a chance to save—it can also retype text you saved but then deleted. The keystrokes are saved in a text file that can be examined or changed by any word processor or text editor.

When I first heard about Last Resort, it was available only for DOS. But since then, so many users have complained about crashes in Windows that the company has developed a Last Resort for Windows as well.

- **Working Software** 800/229-9675, 408/423-5696, 408/423-5699 (fax)
  Reader service no. 680

Wavy Windows

Q The picture on my PC's Magitronic brand monitor suffers from waves of horizontal motion that move slowly from the top of the screen to the bottom. The dealer who sold me the system is out of business, and the warranty has expired. Can you help me?

Kelly L. Spicer, Colorado Springs

A The wavy motion you're experiencing is usually due to electromagnetic interference rather than a defect in the monitor. It can happen when the monitor is too close to another monitor, a fluorescent lamp, an audio speaker, an electric motor in a clock, or anything else that generates a strong magnetic field. Wavy displays also can be caused by improper grounding (make sure both your PC and your monitor are plugged into a grounded outlet) or by a faulty monitor cable.

If these tactics don't solve your problem, contact the distributor, Liuski Int'l of Melville, New York (516/454-8220).

Gigantic Graphics

Q I often carry files between my home and office on floppy disks. Recently, I created a graphics file that's too big for one floppy. How can I transport the file on floppy disks?

Hai Tang, San Francisco

ILLUSTRATIONS: JAMES YANG

PC WORLD
LOTUS EDITION

SAVE 58%

Introducing PC WORLD Lotus Edition. Get the latest news and comprehensive reviews of PC products plus a large special section devoted solely to Lotus product information.

Enter my subscription to PC WORLD Lotus Edition and bill me at the special rate of only $19.97 for 12 monthly issues.

Name

Company

Address

City/State/Zip

Mail this card • Fax: 415-882-0936
or call 800-825-7595 x 501

Please allow 6 to 8 weeks for delivery of your first issue. Offer good only in the U.S. Basic subscription rate is $29.90. Savings based on newsstand price of $47.40.

Recycled Paper 42CZ0

A B C D E F G H

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

PC WORLD
LOTUS EDITION

Super Offer

Yes! *Please enter my subscription to the special* ***PC WORLD Lotus Edition*** *and bill me at the special charter rate of only $19.97 for 12 monthly issues - 58% off the newsstand rate. Just $1.67 per issue!*

Name

Company

Address

City/State/Zip

Mail this card or call 800-825-7595 X501 • Fax: 415-882-0936

Please allow 6 to 8 weeks for delivery of your first issue. Offer good in the U.S. only. Basic subscription rate is $29.90. Savings based on newsstand price of $47.40.

Recycled Paper 42CY2

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World Lotus Edition
Subscription Department
P.O. Box 55011
Boulder, Colorado 80321-5011

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD
LOTUS EDITION
Subscription Department
P.O. Box 55011
Boulder, CO 80321-5011

A One of the best ways to solve this problem is to use PKZip 2.04G, the latest version of PKWare's acclaimed archiving program. Unlike version 1 of PKZip, the newer product allows an archive to span more than one floppy disk. You can download PKZip as the file PKZ204G.EXE from virtually any BBS or online service, including PC World Online. If you register PKZip, you get a handy reference card listing all the commands that are useful for spanning multiple disks.

A less effective way to solve the problem is to compress the floppy disk using DOS 6.0's DoubleSpace utility. This solution lets you write more data to the disk, but once you exhaust its new capacity, you're back where you started. Also, you need DOS 6.0 on both machines—an upgrade that costs much more than PKZip.

To Reach the Unreachable File

Q Not long ago, I created a file named BILL 1.DBF. Trouble is, because of the space in the middle of the name, DEL BILL 1.DBF doesn't delete the file. Unless I reformat my hard disk, am I destined to live with this file for the rest of my life?

Audrey Troyka, Wantaugh, New York

A While DOS commands can't directly handle file names with spaces in the middle, they can refer to them using wild-card characters. The command **DEL BILL?1.DBF** will delete the file. (Naturally, if you want to keep other files that match that wild-card specification, you should copy them to another directory and restore them after the delete operation.) This technique can also be used to handle other characters which are hard (or even impossible) to specify on the DOS command line—such as lowercase letters.

Another way to fix file names with odd characters is to use a disk editor such as Norton's DISKEDIT. Be careful not to change anything but the file names, though, or you may cause serious damage to your data.

The Cache That Matches

Q I use SmartDrive, the disk caching program that came with MS-DOS 5.0. But PC Tools' disk fixer and disk optimizer insist that the cache be turned off when I'm using either of them. Is there any way to accomplish this without editing AUTOEXEC.BAT and rebooting?

Fred Hohn, Andover, Massachusetts

A No, not readily. However, since you already have Central Point's PC Tools, you already have an excellent solution. Use that package's cache program instead of SmartDrive. The other tools are intimately familiar with that program and can turn it off at will, saving you the trouble of reconfiguring. (The same holds true if you're using Norton Utilities; its defragger and disk fixer know how to turn off Norton's NCACHE.) You're likely to see better performance as well.

Mo' Slow

Q I recently upgraded from a 286 computer to a 486. Simulations and games that were playable on the old machine now run too quickly. Is there some way, in software or hardware, to slow these programs down?

David Cowell, Webster, New York

A Many shareware and free programs can slow a machine down. Two that we've added to our library on PC World Online are Mo' Slow (MO_SLOW12-.ZIP) and Varislow (VARISLOW.ZIP); they're also available in the IBMSYS and IBMHW forums, respectively, on CompuServe. Each works by literally wasting the machine's time so it doesn't have as much power to run your program quickly.

CD Roam

Q How can I run an external CD ROM drive from my Toshiba T4400C portable, which has no slots for controller boards?

Justin L. Bauman, Beverly Hills, California

USER GROUP OF THE MONTH

Capital PC User Group

The September user group tips come from the Washington, D.C., Capital PC User Group. The CPCUG holds two monthly meetings, one in Bethesda, Maryland and another in Springfield, Virginia, and publishes a 50-page monthly magazine with a 4-page listing of volunteers willing to give technical support. The group maintains an 11-line bulletin board system with more than 100 conferences, and a 50MB shareware library, which members can access at meetings or at the group's offices. CPCUG has special interest groups in Windows, OS/2, Visual Basic, FoxPro, desktop publishing, accounting software, communications, AutoCAD, and other areas.

For more information, contact Rich Schinnell at 51 Monroe St., Ste. PE-2, Rockville, MD 20850. Call 301/762-6775 for recorded information, or log on to CPCUG's BBS at 301/738-9060. Family memberships cost $35 for one year, $65 for two years.

Reader service no. 681

VIDEO DRIVER RESCUE: Ever install a new Windows video driver, exit and reenter Windows, and find yourself looking at a blank or unreadable screen? When that happens, changing back to your old, reliable driver from inside Windows just isn't possible. Luckily, you don't have to. In DOS, change to your WINDOWS directory and type SETUP /I. This will launch Windows' DOS-based setup program and keep the program from trying to guess your hardware. It's then an easy matter of following the prompts to reinstall your old driver.

Charles Kelly
Capital PC User Group

The notebook industry's first 4mm, full-travel keyboard with the look and feel of a desktop system.

Built-in Windows plus 50MHz 486DX2 processor (with coprocessor) for blazing performance.

TEXAS INSTRUMENTS
TravelMate 4000E
486 WinDX2/50MHz

TravelMate, WinDX2 and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. Ballpoint and Quickport are trademarks of Microsoft Corp. Ethernet is a registered trademark of Xerox Corp. The Intel Inside logo is a trademark of Intel Corp. The Ready-to-Run logo is a trademark of Microsoft Corp. ©1995 TI.
*Based on industry standard application performance speed tests.

New brilliant Active Matrix display – 640 x 480 VGA with high-speed video system for lightning fast graphics.

New TI TravelMate 4000E WinDX2™/50 Active Matrix Color

ACTIVE COLOR. 486DX2 50MHz POWER. WINDOWS IN 15 SECONDS. HEY, WHAT ARE YOU WAITING FOR?

If you've been waiting for an active matrix color notebook with true desktop power, your wait is over. Thanks to the new TravelMate 4000E WinDX2/50 Active Matrix Color notebook from Texas Instruments.

With 256 brilliant, simultaneous colors and a 50MHz 486DX2 processor, this powerhouse doesn't just whisper color, it screams it.

And yet the TravelMate 4000E weighs a mere 6.2 pounds, including battery. This convenient size and weight gives you more performance* than the leading 486 notebooks.

New, desktop-like keyboard with separate function keys.

Thanks to the built-in Windows 3.1 and useful TI utilities, you can power up to Windows in just 15 seconds. And the TravelMate 4000E is Windows NT-compatible. With 4MB of main memory, expandable to 20MB, you're ready for today's and tomorrow's software.

Using the mouse on the TravelMate 4000E is a snap. The Microsoft BallPoint™ mouse with QuickPort™ connection snaps on and off and needs no cable, giving you more flexibility and better ergonomics than a built-in mouse. With the industry's first 4mm, full-travel keyboard, the TravelMate 4000E gives you the feel of a desktop.

If you work on the go, you'll also go for the rugged 200MB hard disk drive, the high-speed video bus and 1MB of video RAM, as well as the full range of connectivity options – snap-on modules for Ethernet® LANs, SCSI-compatible devices and an internal 14,400 bps V.32 bis modem with 9,600 bps send/receive fax capability.

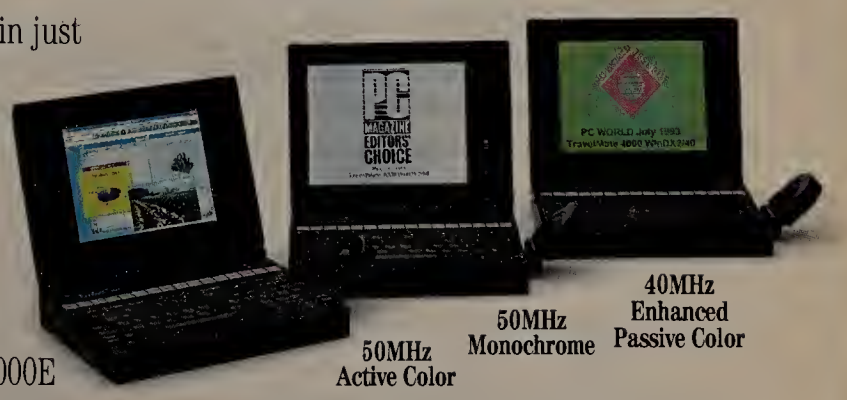
50MHz DX2 processor with coprocessor provides desktop performance in a notebook.

Of the leading active matrix color notebook manufacturers, only TI offers the desktop performance of a 50MHz DX2 processor.

Active Color Notebook	*Weight (lbs.)*	*486 Processor*	*Speed*	*Coprocessor*
TravelMate 4000E	**6.2**	**DX2**	**50MHz**	**Yes**
Toshiba T4600C	6.9	SL	33MHz	Yes
Compaq LTE Lite 4/33c	6.5	SL	33MHz	Yes
IBM ThinkPad 720C	7.6	SLC2	50MHz	No

Texas Instruments offers over 10 models of 486 notebooks for you to choose from.

TI TravelMate 486DX2 Notebooks



For more information about the world's widest range of 486 notebooks, as well as the location of the dealer nearest you, don't wait another nanosecond. Call ***1-800-527-3500***.

EXTENDING YOUR REACH WITH INNOVATION™

TEXAS INSTRUMENTS

Circle 220 on reader service card

A Laptop owners have several choices if they want to hook CD ROMs to their machines. If your laptop has ISA-compatible slots, you can use just about any external SCSI drive. However, this isn't an option for those of us who don't like hefting very large, heavy computers; most laptops with ISA slots weigh at least 18 pounds. If you have a slimmer portable without standard slots, chances are you'll need to go with a parallel-port SCSI adapter, such as the MiniSCSI Plus from Trantor Systems ($229) or the AL-1000 from Always Technology ($199). Each of these adapters comes in the form of a cable that connects to your parallel port at one end and the SCSI connector of a CD ROM drive at the other. A pass-through printer port is provided, so you don't have to give up printing when you run the CD ROM. Trantor and AST have also announced that they will soon be shipping SCSI adapters that fit into PCMCIA card slots.

Your T4400C doesn't have a PCMCIA slot, but it does have a parallel port that can be used with either Trantor Systems' or Always Technology's parallel-port-to-SCSI adapters. Toshiba also offers a proprietary (though relatively expensive) SCSI interface that fits right into the T4400C.

- **Trantor Systems Ltd.** 800/872-6867, 510/770-1400
  Reader service no. 682
- **Always Technology** 818/597-1400, 818/597-1496 (fax)
  Reader service no. 683

Don't Punch Out Your Disks

Q I've seen many ads for double disk converters—metal punches that add a hole to a 3½-inch double-density disk so the drive thinks it's high density. The ads claim no loss of reliability. Are they correct?
Michael Farris, Oswego, Kansas

A In many cases, the media inside double-density and high-density disks are identical. However, high-density disks are more thoroughly tested, which means they're more likely to be free of surface defects. And punches can create small chips of plastic, which may migrate inside the disk case or the drive and scratch the disk's surface.

Since there's only a small price difference between double- and high-density disks, even a small risk of lost data isn't worth the paltry sum you'll save. Buy disks certified for high-density operation, or use a data compression program to pack more data onto the disk. You'll sleep better knowing your data isn't entrusted to potentially faulty media.

Balky Backup

Q Since I installed a memory manager on my machine, Norton Backup 1.2 occasionally refuses to back up my hard disk. It claims that my system configuration has changed and that I must repeat all of Norton Backup's reliability tests. Can you help?
Bob Loon, San Francisco

A Norton Backup 1.2 checks certain parts of your computer's BIOS ROM to make sure you haven't copied the program to another machine and tried to use it without reconfiguring for the new machine. Unfortunately, some memory management programs map RAM into the area formerly occupied by the system BIOS, and the contents of that RAM can change.

The best solution is to upgrade to the latest version of Norton Backup, which doesn't have this problem. But as a stopgap, you can tell your memory manager not to use the BIOS area. This usually means using an "exclude" parameter on the memory manager's command line; consult your memory manager's manual for the exact command.

Looping the Loop

Q I use a utility program to test the serial and parallel ports on PCs. One of the tests requires something called a loopback plug. What does a loopback plug do? Can it be purchased, or must it be made? How do you find out how to make one?
Gilbert F. Vela, Santa Maria, California

A The purpose of a *loopback plug* (also known as a wrap plug) is to connect a port's outputs back to its inputs. This tactic lets the port test itself by sending data to itself (just as you might test a telephone by speaking into the mouthpiece and listening for your voice in the earpiece). Unfortunately, each testing program can require the wires to be connected in a different way, so there's no such thing as a 100 percent "generic" loopback plug. Your best course of action is to call the company that provided the testing software. It should be able to tell you how to make an appropriate loopback plug or where you can buy one.

Who Was That Masked Man?

Q I'm trying to learn more about how the PC works. Can you tell me what an NMI is and what it does?
Greg Taffet, Bridgeport, Connecticut

A The acronym *NMI* stands for *nonmaskable interrupt*. As you may already know, an interrupt is a signal that serves as an alarm for your computer's central processing unit, notifying it of events requiring immediate attention. If an interrupt is *maskable*, the CPU can choose to ignore the alarm when it knows it has something more important to do. This is called *masking* the interrupt—sort of the equivalent of burying the alarm clock under a pillow. But if the interrupt is *nonmaskable*, it can't be ignored; the CPU must stop what it's doing and take immediate action. On the IBM PC and compatibles, a catastrophic event such as a parity error (which indicates faulty memory) triggers a nonmaskable interrupt. Most users become painfully aware that there's such a thing as an NMI when the PC abruptly announces that one has occurred and comes to a dead halt.

Actually, there really is no true NMI on the IBM PC, at least in the strictest sense of the term. The PC's central processing unit can (and does) disable the NMI under certain conditions, but it remains enabled most of the time and has priority over other interrupts.

By Brett Glass

Brett Glass is a contributing editor for PC World. Help Line *welcomes your questions.* *See page 12 for contact information.*

Our sporty new compact can outrun a flatbed.

Introducing the NISCAN GS Plus hand scanners.

It used to be that speed, quality and resolution were reserved for flatbed monsters. No more.

Meet the new NISCAN/GS Plus scanners. The first generation of hand-held scanners that don't need a lot of hand-holding.

With a 16-bit interface, 256 gray shades, optional OCR and up to 400 dpi, it's no wonder why. The GS Plus is faster, leaner and more accurate than many flatbed scanners on the market. And all this capability fits right in the palm of your hand. What's more, the GS Plus is Windows-based, comes with Picture Publisher LE software, a lifetime warranty and free technical support.

The NISCAN/GS Plus and GS Plus OCR scanners, new from NISCA. Because image is everything.

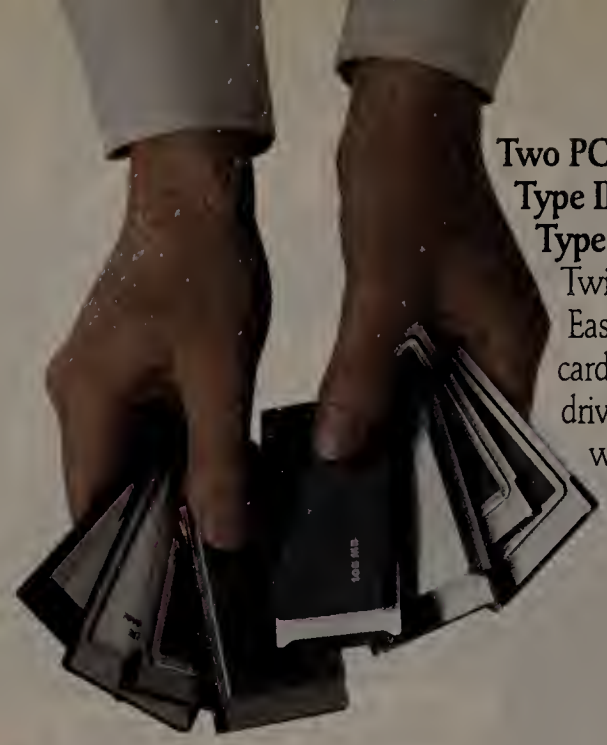
NISCA INCORPORATED
1919 OLD DENTON ROAD
SUITE # 104
CARROLLTON, TEXAS 75006
Office: 214 / 242-9696 • Fax: 214 / 245-0942
NISCA CORPORATION, TOKYO, JAPAN 03-3374-7881

GSA # GSOOK93AG56180

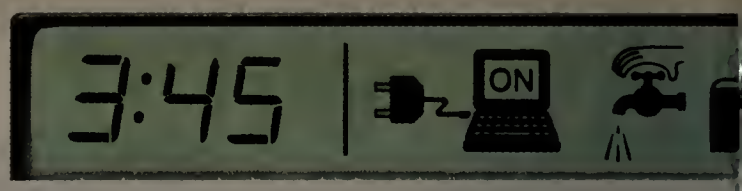
NISCA

image is everything®

Circle 139 on reader service card



Two PCMCIA 2.0 Slots, Type II (5mm) and Type "IV" (16mm): Twice the expandability. Easily accepts multiple cards including hard disk drives, modems and network adapters.



LCD Status Bar: Delivers an instant read of the battery life remaining, power-saving mode, and a host of other key notebook settings.

Blazing 33MHz i486™SL: With built-in coprocessor support, delivers the ultimate in notebook processing power.

Some say the T4600 is
Because in life, there

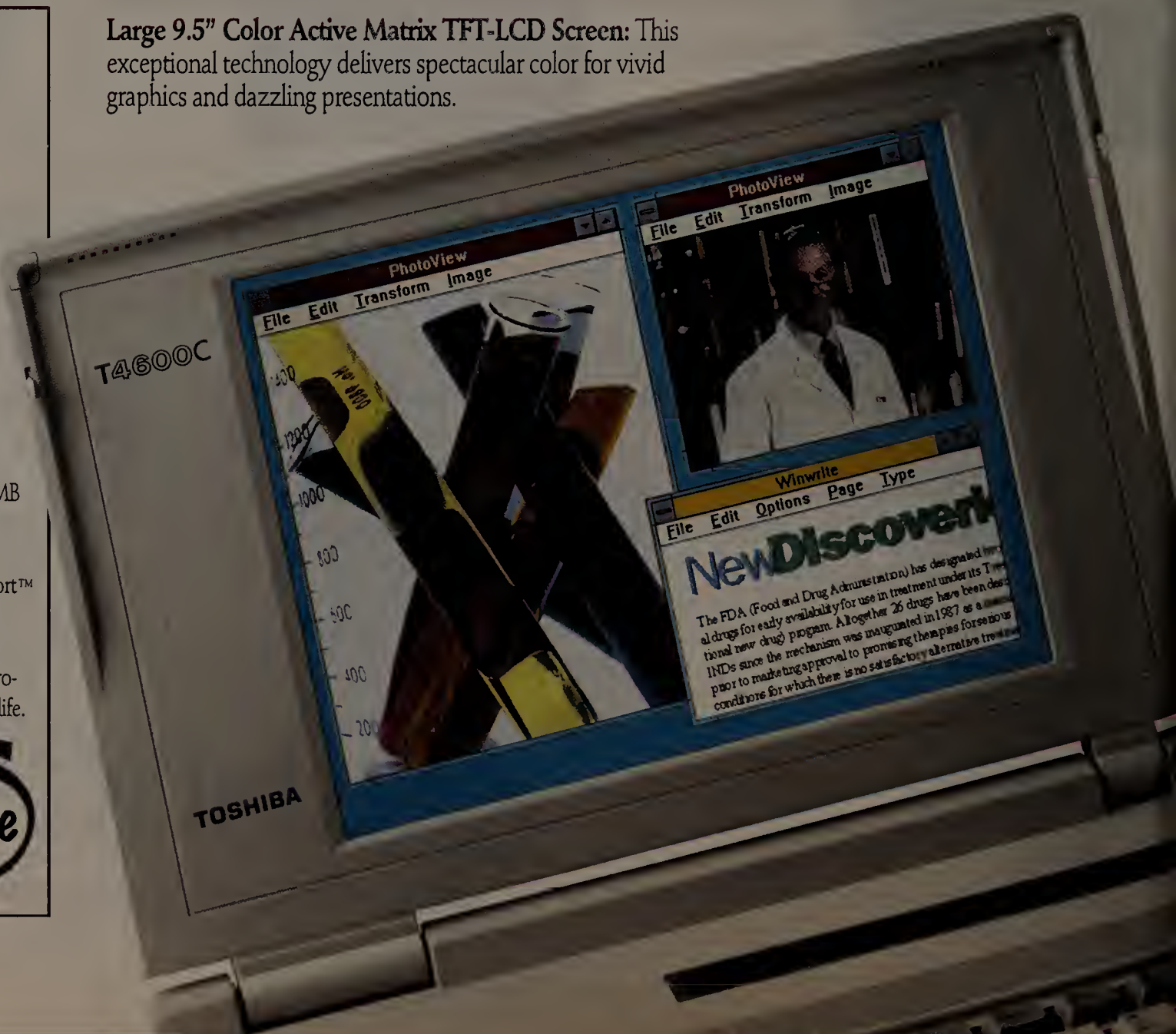
T4600C
- 9.5" color active matrix TFT-LCD screen
- 120/200/320MB HDD
- 6.9 lbs.
- NiMH battery

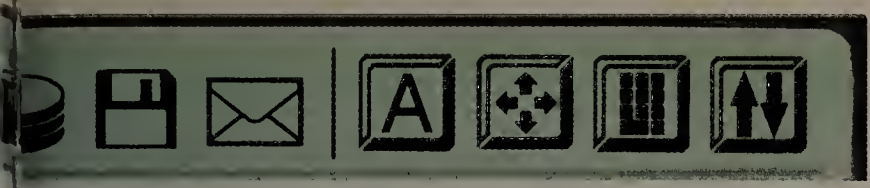
T4600
- 9.5" high-contrast, black and white LCD screen
- 120/200MB HDD
- 6.4 lbs.
- NiCd battery

BOTH MODELS
- Intel 486SL/ 33MHz, 3.3 volt processor with 8K cache
- 4MB RAM expandable to 20MB
- Type II (5mm) and Type "IV" (16mm) PCMCIA slots
- BallPoint™ mouse w/QuickPort™
- Toshiba MaxTime™ Power Management system, and extensive 3.3v components provide industry-leading battery life.
- Pre-installed software: DOS 6.0, Windows® 3.1, and UltraFont.™

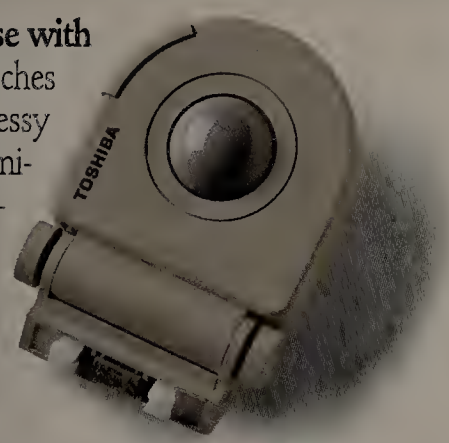
intel inside

Large 9.5" Color Active Matrix TFT-LCD Screen: This exceptional technology delivers spectacular color for vivid graphics and dazzling presentations.





BallPoint™ Mouse with QuickPort™: Attaches easily, without messy cords, for ergonomically ideal input--perfect for Windows® applications.



Replace Your Desktop: Just snap your notebook into the Desk Station IV, and you're instantly connected to your printer, VGA monitor, mouse, and full-size keyboard. Now you only need one computer.

better than life itself. is compromise.

Introducing the T4600 Series. Make no compromise.

Get the awesome power of a 33MHz i486™SL processor, and don't sacrifice battery life. Add a 9.5" color active matrix TFT-LCD screen, and access all 185,193 eye-popping VGA colors. Pack a massive 320MB hard drive and never have to leave a file at home. Get your hands on the BallPoint™ mouse, snap it into its QuickPort™, and never waste a moment or a motion.

Carry two slots for industry-standard PCMCIA cards—including one large enough for the new generation of removable hard drives—and take the next big step in peripherals. Glance at the QuickRead LCD status icon bar for an instant read of battery life, power management, keyboard settings, and more. This is no time for compromise. This is the time to get your hands on the T4600 Series.

For a dealer near you, call 1 (800) 457-7777.

In Touch with Tomorrow

TOSHIBA

© 1993 Toshiba America Information Systems, Inc. The Intel Inside logo is a trademark of Intel Corporation. All product indicated by trademark symbols are trademarked and/or registered by their respective companies.

Circle 228 on reader service card

LOTUS VIDEOS

- Getting Started with 1-2-3 Release 4 for Windows **NEW**
- Using the Power of 1-2-3 Release 4 for Windows **NEW**
- 1-2-3 Release 2.4 Introductory Skills
- 1-2-3 Release 2.4 Intermediate and Advanced Skills
- Getting Started with 1-2-3 Release 2.3
- 1-2-3 Release 2.3, 3.1, and 3.1+ Intermediate Skills: How to Create Powerful Presentations with WYSIWYG
- 1-2-3 Release 2.2 Intermediate Skills: How to Use the Allways Feature
- 1-2-3 Release 2.2 Intermediate Skills: How to Link Your Spreadsheets
- Getting Started with 1-2-3 for Windows
- 1-2-3 for Windows Intermediate and Advanced Skills: How to Unlock the Power of Windows
- Ami Pro 3.0 Introductory Skills **NEW**
- Ami Pro 3.0 Intermediate-Advanced Skills **NEW**
- Getting Started with Ami Pro 2.0
- Using the Power of Ami Pro 2.0
- Freelance Graphics for Windows 2.0

Any 2 for $89.95

Videos sold separately. . . . $49.95

Lotus Videos are tightly focused, step-by-step tutorials designed to quickly get users up and running with the fundamentals and key features of Lotus software applications. These videos are self-paced, making software learning a dynamic visual experience that enhances your PC skills.

The Official Lotus Videos

To Order Now, Call

1-800-824-5520

or fax 410-543-2921

Lotus Publishing Corporation
P.O. Box 1743, Salisbury, MD 21802

© 1993. Lotus Publishing Corporation. Lotus Publishing Corp. is an IDG Communications Company. Lotus is a registered trademark of Lotus Development Corp.

Please add $3.95 per video for shipping and handling. PVA3

LOTUS PRODUCT CBTs

Computer-Based Training Tutorials

Learn your Lotus software quickly through the ease of your PC. Just place a Lotus CBT disk into your PC. An interactive window on your screen guides you through each operation while dialogue boxes show you what is happening. You'll get product-specific, hands-on training on Lotus software. It's quick and easy!

To Order Now, Call

1-800-824-5520

or fax 410-543-2921

Lotus Alliance Series

- *Lotus cc:Mail 2.0 for Windows*
- Lotus cc:Mail Remote 2.0 for Windows*

ATI Teach Me Series

- *1-2-3 Release 4 for Windows*
- 1-2-3 for Windows Release 1.0
- 1-2-3 Releases: 3.4, 3.1, 2.3, 2.2 or 2.0
- 1-2-3 Macros Releases 2.2 or 2.0
- Freelance Graphics Release 3+
- Symphony Release 1.0

CBTs sold separately $49.95

*Available Fall 1993

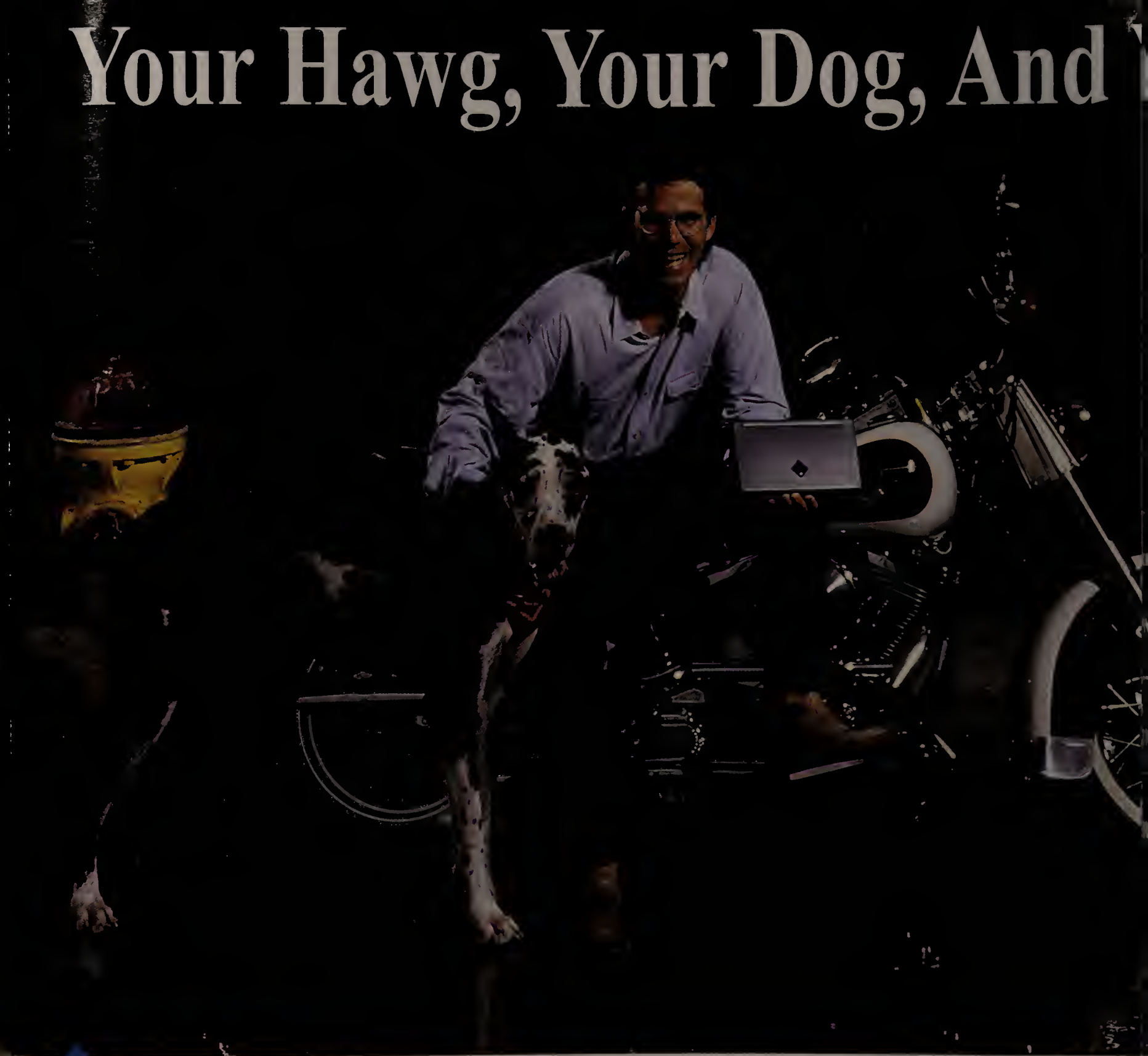
Lotus Publishing Corporation
P.O. Box 1743, Salisbury, MD 21802

Site Licenses available
Please add $3.95 per CBT for shipping and handling PTA3

© 1993. Lotus Publishing Corporation. Lotus Publishing Corp. is an IDG Communications Company. Lotus is a registered trademark of Lotus Development Corporation. ATI represents American Training International. All company and product names are trademarks of their respective corporations

In Life,
Only A Few Things
Inspire Passionate Loyalty.

Your Hawg, Your Dog, And



"You'll have to pry my cold, dead fingers off to get it away from me." That's what an editor told us once about the Gateway 2000™ HandBook we sent him for evaluation.

A journalist covering the conflict in Somalia called to tell us his HandBook was so popular among his colleagues that he could sell dozens of them for us.

Another user wrote, "The HandBook has changed my life in a way that only a few other products ever have. I take it everywhere with me — something I never did with other notebooks."

This is a tiny sampling of the response to the original HandBook. Clearly, the HandBook — the pioneer product in an entirely new category dubbed "subnotebook" computers — inspired the kind of loyalty usually reserved for Harley-Davidson® motorcycles and man's best friend.

Introducing The HandBook 486

Now we are proud to introduce the next generation of the HandBook — the HandBook 486. Since we began marketing the original HandBook a little over a year ago, we've been asking customers to finish this statement: "I'd like my HandBook better if _____." The HandBook 486 includes most everything anybody asked for while retaining all the things people love.

The HandBook 486 still weighs under three pounds and is smaller than the day planners many people carry. The new HandBook still has a great keyboard, excellent battery life, a backlit screen, and that wonderful HandBook suspend/resume feature. But the new HandBook has some important features the original didn't have.

Your HandBook®486!

Real Intel® 486 Power

People using the original HandBook asked for more power. They asked for a HandBook that would run Windows.™ We gave them both in the HandBook 486. It's the smallest Windows PC in the world — and when using a 486DX2 processor, the HandBook 486 is by far the most powerful PC of its size. New HandBook models include Intel's 3.3v 486 processors and come with 4MB RAM, expandable to 20MB, and large hard drives.

Backlit VGA, Built-In Pointer, PCMCIA

Users asked for VGA. The new HandBook's screen is a black-and-white VGA display, backlit for use in any lighting situation. No need to carry a mouse with your HandBook 486. The built-in pointing device is convenient and easy-to-use. The HandBook 486 also includes one PCMCIA Type II slot, and the card fits entirely within the footprint of the HandBook.

The Bottom Line

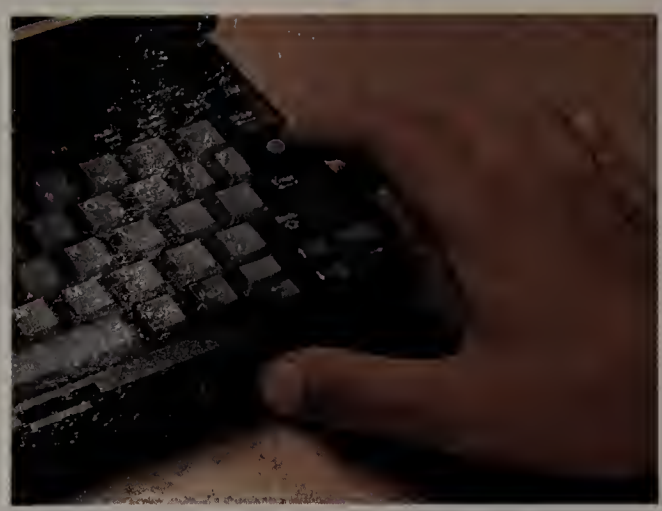
HandBook 486 models start at only $1,495, an extraordinary value even by Gateway's standards — and we wrote the book on value! We have a reputation for offering the best prices on high-quality products with exceptional service from friendly folks in the Midwest. Give us a call. Once you get your hands on a HandBook, you'll wonder how you ever lived without one!

GATEWAY2000

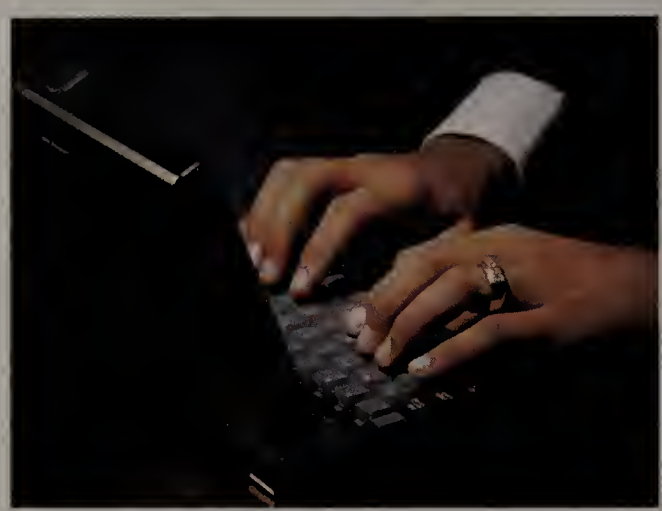
"You've got a friend in the business."®

800-846-2051

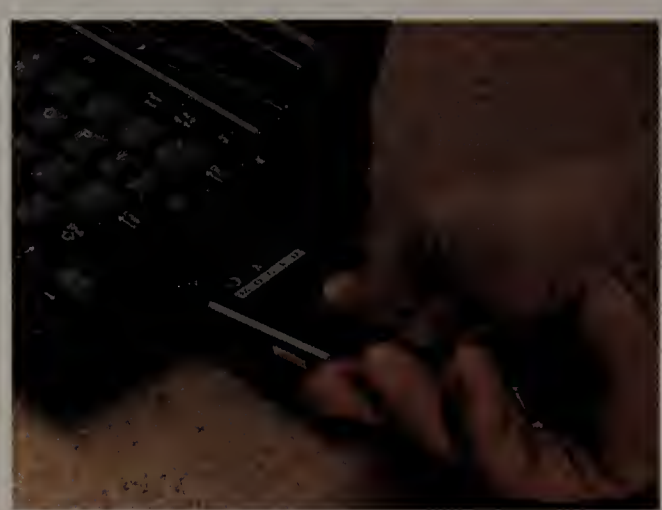
Introducing The HandBook® 486!



The HandBook 486 has a handy, integrated pointing device.



Even though the HandBook is very small, it has an excellent, touch-type keyboard. You'll also appreciate the sturdy, heavy-duty plastics used in the case.



Options: PCMCIA fax/modem cards, PCMCIA VGA card, PCMCIA network cards, external floppy drive, 4MB or 16MB RAM upgrades, alkaline battery pack, carrying case and extra NiMH batteries. Call for details.

FEATURES

Size

The difference between a 3-pound portable and a 4-pound portable doesn't sound like very much until you lug one around for hours. Then every ounce counts! HandBook users swear by the size of this product. It's big enough to be fully functional, but small enough to take anywhere effortlessly.

Intel® 486SX or DX2 Processor

Your HandBook 486 includes a genuine 32-bit Intel 486 processor — not some chip that's *almost* a 486. Those who crunch numbers will love the high-performance numeric coprocessor in the DX2.

Backlit VGA Display

The HandBook's VGA display is easy on your eyes. The screen is backlit for use in all lighting situations so you won't ever be left in the dark.

PCMCIA Type II Slot

A PCMCIA slot is a great way to add a modem, network card or any of dozens of available PCMCIA-compatible peripherals.

HANDBOOK 486SX-25

- Weight: 2.9 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- Intel® 25MHz 486SX Processor
- 4MB RAM (expandable to 20MB)
- 80MB IDE Hard Drive
- 7.9" Backlit VGA Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 1 PCMCIA Type II Slot
- Integrated Pointing Device
- 78-Key Keyboard
- Parallel, Serial & PS/2 Ports
- MS-DOS,® Windows,™ Interlink and Serial Download Cable

$1495

HANDBOOK 486DX2-40

- Weight: 2.9 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- Intel® 40MHz 486DX2 Processor
- 4MB RAM (expandable to 20MB)
- 130MB IDE Hard Drive
- 7.9" Backlit VGA Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 1 PCMCIA Type II Slot
- Integrated Pointing Device
- 78-Key Keyboard
- Parallel, Serial & PS/2 Ports
- MS-DOS, Windows, Interlink and Serial Download Cable

$1995

TRAVELER'S PACK

- Carrying Case
- Extra NiMH Battery
- Alkaline Battery Pack
- PCMCIA Fax/Modem

Call For Details

PRESENTER'S PACK

- PCMCIA VGA Adapter
- Asymetrix® Compel
- Carrying Case

Call For Details

intel inside

GATEWAY 2000

"You've got a friend in the business."®

800-846-2051

610 Gateway Drive • P.O.Box 2000 • North Sioux City, SD 57049-2000 • Phone 605-232-2000 • TDD 800-846-1778 • Fax 605-232-2023 • FaxBack 605-232-2561

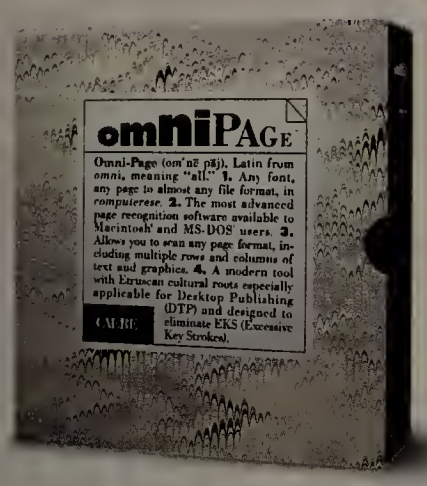
Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (Central Time)

©1993 Gateway 2000, Inc. Black-and-white spot design, "G" logo and "You've got a friend in the business" slogan are registered trademarks, and Gateway 2000 is a trademark of Gateway 2000, Inc.
The Intel Inside Logo and Intel are registered trademarks of Intel Corporation. Harley-Davidson is a registered trademark of Harley-Davidson, Inc. All other brands and product names are trademarks or registered trademarks of their respective companies. Prices and configurations are subject to change without notice. Prices do not include shipping.

Cash in on OmniPage.

$200 Rebate

For a limited time, OmniPage® Professional, the business professional's choice in OCR, comes with a $200 rebate. And if that isn't enough, you'll also receive a free copy of Image Assistant™, Caere's Image editing software.



$100 Rebate

Thinking about buying a scanner? A hundred dollars back on OmniPage® should make the decision an easier one. And a smarter one too. Because not only is OmniPage easy-to-use, it handles just about any layout, font, or text element.

$295 SRP

Now OmniPage® Direct is an unbeatable value, no matter when you purchase it. Direct adds the world's most accurate text recognition directly to your working applications.

There's never been a better time to upgrade your scanner. Because when you buy OmniPage Professional or OmniPage between August 1, 1993 and October 15, 1993, not only will you get the most accurate, easy-to-use OCR available, you'll also get something more. Cash back direct from Caere. And when you purchase OmniPage Direct, you'll be rewarded with a new suggested retail price. So stake your claim now. For more rebate or product information, call **1-800-535-SCAN**.

omniPAGE®

caere™

For Your Information.

Caere and OmniPage are registered trademarks of Caere Corporation. The Caere logo is a trademark of Caere Corporation. ©1993. All rights reserved.

Circle 21 on reader service card

SPREADSHEETS Q & A

Recording Rank Order

Q Your macro solution on how to assign ranks to a list of items without changing their order ("1-2-3 Rank Order," April 1993) certainly works, but I've got a simpler approach. Just insert a column of numbers to record the order of the items, then sort the data column and the column that keeps track of the order. Add a column of numbers to record the ranks, then sort the data again—using the column that recorded the original order as the sort key—to restore the original order.
Ron Saritsky, Van Nuys, California

A Thanks, Ron. A number of readers, responding to my plea for a better idea, wrote in with this solution. Blinded by macro wizardry, I overlooked it. Here are the details (illustrated in 1-2-3 for Windows release 1.1, but the technique works in any spreadsheet). Let's assume the original list of items is in A2..A15. To record their order, select the range B2..B15, choose *Data•Fill*, enter a Start value of **1**, and click *OK*. To put the first column in numerical order while remembering the items' current order, select A2..B15, choose *Data•Sort*, enter **A2** in the Primary key text box, and be sure the Ascending radio button is checked. Click *OK*. Now select C2..C15, choose *Data•Fill*, enter **1** in the Start text box, and click *OK*. Next, select A2..C15, choose *Data•Sort*, enter **B2** in the Primary key text box, and click *OK*. The first and second columns revert to their original order, and column C assigns a rank to the items in column A.

Searching for Nothing in Excel

Q I use Excel 4.0 as a database. The data that arrives on my desk is often incomplete, so I leave some cells blank. Later, when the missing information appears, I go back to the database and fill in the missing values. What's the best way to accomplish this job?
Judith Daley, San Francisco

A I've got two solutions: One that's quick and another that's flexible but time-consuming. Look at **FIGURE 1**. There are missing values in column D. To locate them quickly, click the *D* in the worksheet's frame to select the entire column. Now select *Formula•Find*. Don't enter anything in the Find What text box, just click *OK*. The active cell indicator moves to the first blank cell in the selection (column D). Type an entry, if you have one, then press **F7**, and the next missing value in the selection becomes the active cell.

If you've used *Data•Set Database* to create a database (as we have in cells A4:D12 of Figure 1), you can use the Data•Find command to locate blank rows, and it also lets you make entries in other cells in that record (row). A1:D2 is a criteria range (set it with *Data•Set Criteria*). Put an equal sign (=) in D2 to select records with no value or empty cells. Select *Data•Find*, and Excel highlights Bilbo's record, on row 6, which is missing a value. When you press **<Left>** or **<Right>**, the active cell indicator moves to the other fields in that record, where you can enter or edit the values. **<Up>** and **<Down>** move the selection to the other records with missing codes.

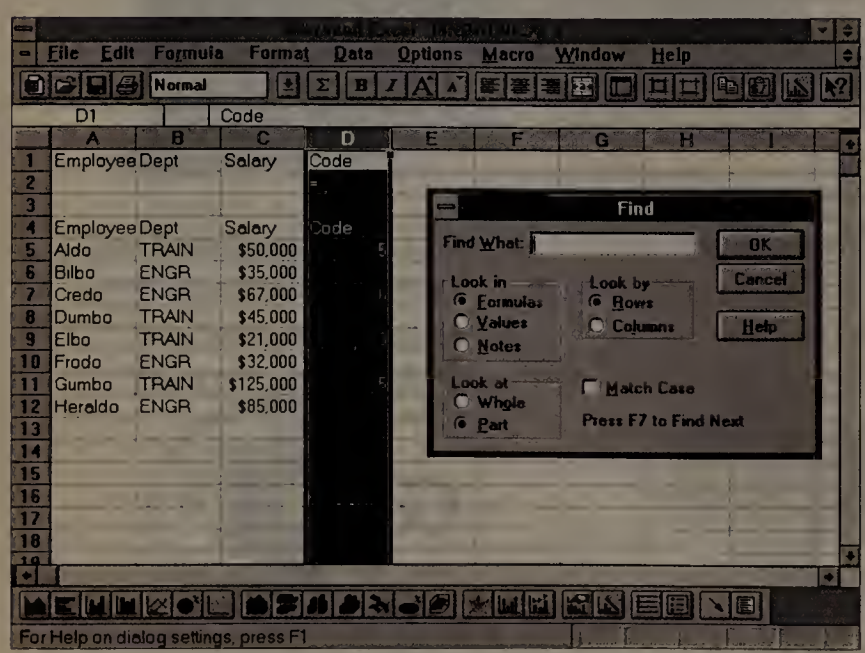


FIGURE 1: FIND MISSING VALUES QUICKLY IN EXCEL by selecting a column and using the Formula Find or Data Find command.

Selection Without the Mouse in Excel

Q I love using the <Ctrl> key with the mouse in Excel to select multiple ranges. How can I perform the same trick with just the keyboard?
Belinda Wagstaff, Birmingham, Alabama

A No sweat. Move the active cell indicator to one corner of the first range you want to select, then hold down the **<Shift>** key and move the active cell indicator to the range's opposite corner. Then press **<Shift>-<F8>**, move the active cell indicator to the beginning of the next range, hold down **<Shift>** again, and select the next range. Repeat the process until you're finished.

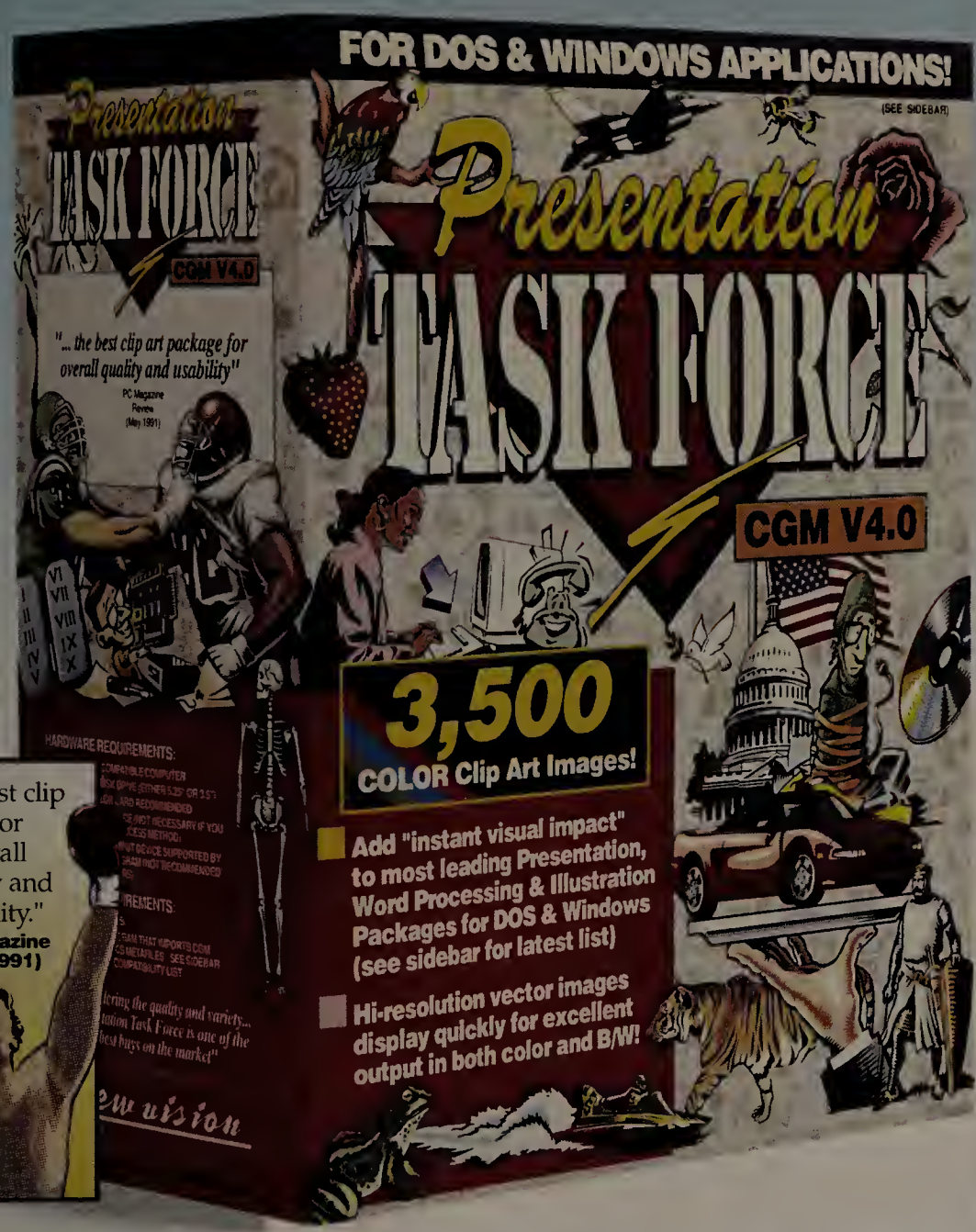
Don't forget that you're not limited to just the cursor keys for extending the selection. You can also use <Page Up>, <Page Down>, <End> followed by a cursor key, and other keys that move the active cell indicator while you're holding down the <Shift> key.

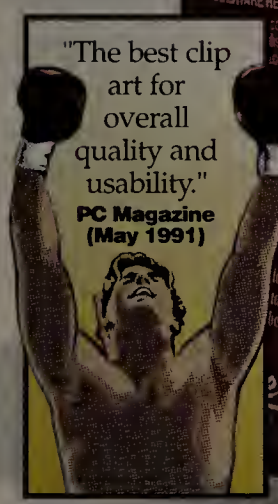
Printing Graphs in 1-2-3 Release 3.1

Q How can I print two graphs on my HP LaserJet III in portrait orientation, on a single page using 1-2-3 release 3.1? I'll bet I've gone through about two trees worth of paper trying to solve this problem.
Byron Flurie, Charlotte, North Carolina

A Spare that tree! Try the following steps instead. Set up the first graph you want to print and name it by selecting */Graph•Name•Create* and entering a name—**Graph 1**, for example. Now select */Graph•Reset* to clear away the first graph, then set up and name the second graph.

Next configure the page by selecting */Print•Printer•Options•Margins•Top* and entering **0**. Select *Margins•Bottom*





PRESENTATION TASK FORCE CLIP ART KNOCKS OUT THE COMPETITION!

For quality and value, there are NO contenders!

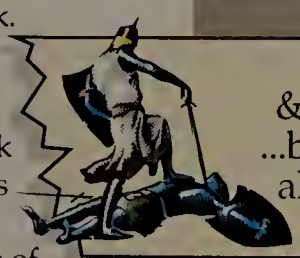
If you're looking for a comprehensive collection of high quality clip art that can be used with over 60 DOS, Windows and OS/2 business applications (see sidebar) ... consider Presentation TASK FORCE 4.0.

PTF 4.0 is the ONLY clip art library to give you **3,500 full-color CGM images** in a MASSIVE, all-in-one collection. At only $199.00, PTF 4.0 is widely recognized as today's best clip art value. Smaller collections, with far fewer images can cost you hundreds (often thousands) of dollars more!

And that's not all! PTF 4.0 includes a **FREE "Color to B&W" Conversion Utility** ($59.00 value) that allows you to optimize PTF color files for dynamite-looking output on b&w printers.

Short on hard disk space? No problem. PTF images are uncompressed, and can be accessed directly from floppy disks. Install the complete collection, or any combination of individual image categories to your hard disk. You decide!

It's unanimous! Presentation Task Force 4.0 delivers a powerful one-two combination of both quality and value, making it the undisputed heavyweight champion of the clip art world.



"Outstanding value & excellent art to boot! ...by far the best value of all the clip art libraries we reviewed."

PC Computing (May 1992)

PRESENTATION TASK FORCE IS A REGISTERED TRADEMARK OF NEW VISION TECHNOLOGIES INC. ALL OTHER PRODUCT NAMES ARE THE PROPERTY OF THEIR RESPECTIVE COPYRIGHT OWNERS. ALL PRICES SHOWN IN US DOLLARS (DEALERS MAY SELL FOR LESS). CANADIAN MSL $229.00. CALL FOR INTERNATIONAL PRICING. NEW VISION TECHNOLOGIES INC., 38 AURIGA DRIVE, UNIT 13, NEPEAN, ONTARIO, CANADA K2E 8A5 TEL (613) 727-8184, FAX (613) 727-8190

Circle 177 on reader service card

Presentation TASK FORCE

WORKS WITH:

OS/2 APPLICATIONS · MICROSOFT WINDOWS APPLICATIONS · DOS APPLICATIONS

- ALDUS FREEHAND
- AMI PROFESSIONAL
- APPLAUSE II
- CHARISMA
- CORELDRAW!
- DESIGNER
- DRAWPERFECT
- EXPRESS PRESENTER
- EXPRESS PUBLISHER
- FREELANCE GRAPHICS
- FREELANCE GRAPHICS FOR WINDOWS
- HARVARD DRAW
- HARVARD GRAPHICS 3.0
- HARVARD GRAPHICS FOR WINDOWS
- HIJAAK
- HIJAAK FOR WINDOWS
- HOLLYWOOD
- LOTUS 1-2-3
- MICROSOFT EXCEL 4.0
- MICROSOFT PUBLISHER
- MICROSOFT WORD FOR WINDOWS
- MULTIMATE
- PAGEMAKER FOR WINDOWS
- PERSUASION FOR WINDOWS
- POWERPOINT FOR WINDOWS
- PRESENTATION EXPRESS
- PRESENTATION TEAM
- PROFESSIONAL WRITE PLUS
- QUATTRO PRO
- SCRAPBOOK+
- VENTURA PUBLISHER FOR WINDOWS
- WINDOWS DRAW
- WORDPERFECT 5.0, 5.1, 6.0
- WORDPERFECT FOR WINDOWS

PLUS DOZENS MORE!

Available at Software Resellers Everywhere!

Master Class: Sorting 1-2-3 Sheets

Paul Caron, a budget wrangler from Arlington, Virginia, asked if I could suggest a macro to sort the sheets in his 1-2-3 release 3.1 application, because 1-2-3's *Data • Sort* command can sort only rows, not columns or sheets. He has a 110-sheet file, each sheet containing data for a different country. Each sheet is assigned a geographical region. Paul keeps the sheets in alphabetical order by country but frequently wants to see them ordered by region.

The solution I came up with is the macro shown in FIGURE 1. The general layout of the file is shown in FIGURE 2. The macro is located on sheet A:. The macro makes two assumptions about the layout of the individual country worksheets. First, each sheet must include a range name that covers the entire active area of that sheet, as illustrated for China on sheet B: in Figure 2. Second, each sheet contains a pair of labels. The one in cell A1 duplicates the range name (so on sheet B:, cell A1 contains the label 'China'); another in B1 identifies the region. The other range names in the worksheet are given in E11..F24 in Figure 1.

The macro begins by creating a 3-D range ('NAMES' in Figure 2), which covers the sheet names and region labels in all sheets. Then it transfers the list of sheet names and regions from NAMES into the range \S_LIST beginning at cell E1 in sheet A: and sorts the resulting table in descending order by region. A subroutine processes each sheet name in the table, inserts a new sheet just after the macro sheet, moves the next sheet indicated in \S_LIST into it, and then deletes the now blank sheet. The details follow.

In cell B3, {goto}B:A1~ positions the cell pointer on the first sheet, at the beginning of the NAMES range. The /rncNAMES~{bs}.{end}{ns}{r}~ in B4 redefines the range name NAMES to include all the consecutive country sheets. The {bs} keystroke shrinks the range selection to the current cell, B:A1; {end}{ns} extends the selection through the stack of worksheets; and {r} widens the selection to include the region labels.

The statement {blank \S_LIST}/rtNAMES~\S_LIST~w in B5 clears the previous table of sheets, then executes the command */Range • Transpose*, which copies the sheet and region names from NAMES into \S_LIST. The w selects */Worksheets • Rows* to ensure that the data is copied into the proper place.

In cell B6, {if @count(\S_LIST)<3}{quit} aborts the macro if less than two sheet names emerged. In B7, /rnc\S_LIST~{esc}.{end}{d}{r}~ redefines \S_LIST to cover the current list of sheets and regions. In cell B8, /dsrd\S_LIST~p\S_KEY~d~g sorts the table of sheets and regions, using region (\S_KEY) as the primary key.

The statement {for \S_CT,0,@rows(\S_LIST)-1,1,\S_MOVEIT in B9 executes the subroutine at \S_MOVEIT (cell B11) once for each sheet

	A	B	C	D	E	F
1	@MACROS					
2						
3	\S	{goto}B:A1~		\S_LIST	ISRAEL	MIDEAST
4		/rncNAMES~{bs}.{end}{ns}{r}~			ITALY	EUROPE
5		{blank \S_LIST}/rtNAMES~\S_LIST~w			FRANCE	EUROPE
6		{if @count(\S_LIST)<3}{quit}			THAILAND	ASIA
7		/rnc\S_LIST~{esc}.{end}{d}{r}~			CHINA	ASIA
8		/dsrd\S_LIST~p\S_KEY~d~g				
9		{for \S_CT,0,@rows(\S_LIST)-1,1,\S_MOVEIT}				
10				Range Names		
11	\S_MOVEIT	{let \S_SHEET,@INDEX(\S_LIST,0,\S_CT)}			@MACROS	A:A1..A:A1
12		{goto}{\S_SHEET}~{let \S_DELETE,@cellpointer("coord")}			CHINA	B:A1..B:C10
13		{goto}@MACROS~			FRANCE	E:A1..E:C10
14		/wisa~			ISRAEL	C:A1..C:C10
15		/m{\S_SHEET}~~			ITALY	F:A1..F:C10
16		{goto}{\S_DELETE}~{ns}/wds~			NAMES	C:A1..E:B1
17		{return}			THAILAND	D:A1..D:C10
18					\S	A:B3..A:B3
19					\S_CT	A:B20..A:B20
20	\S_CT				\S_DELETE	A:B23..A:B23
21	\S_SHEET				\S_KEY	A:F4..A:F4
22		{return}			\S_LIST	A:E4..A:F8
23	\S_DELETE				\S_MOVEIT	A:B11..A:B11
24		{return}			\S_SHEET	A:B21..A:B21
25						

FIGURE 1: THIS MACRO SORTS THE SHEETS of a 1-2-3 release 3.1 file. Prepare them as shown in Figure 2.

A SUPERIOR VISION OF MULTIMEDIA.

Introducing the 250ms Double-speed Pro 16 Multimedia Upgrade System II.

Looking for the ultimate multimedia experience? Why saddle yourself with a system that's strictly amateur? For an upgrade without equal, accept nothing less than the Pro 16 Multimedia System™ II.

This state-of-the-art MPC2 ready enhancement for your PC combines NEC's fastest double-speed CD-ROM drive at 300kB/sec and a blazing 250ms access time, with Pro AudioStudio™ 16, the world's best-selling 16-bit, CD-quality, sound card. So whether you're enjoying an interactive CD software title, or navigating through your PC with the included Voice Recognition software — you experience the acoustics of the top 16-bit sound product in the industry. Just ask PC Magazine, who awarded us an Editors' Choice Award for best PC Sound. And it's fully Kodak Photo CD compatible. Plus, you'll find eight of the best-selling CD program titles included in the Pro 16 System. Including Compton's Interactive Encyclopedia. Mayo Clinic Family Health Book. Carmen Sandiego Deluxe. Mantis Experimental Fighter. Civilization. Battle Chess Enhanced. Macromedia's Action! And PC Karaoke.

Purchasing all this separately would set you back twice what Pro 16 costs. Which makes it the best multimedia kit, and the best value.

So for uncompromising quality and performance, insist on the Pro 16 Multimedia System II. Now occupying the top shelf at your local computer dealer.

MEDIA VISION

Call 1-800-845-5870 for information or a dealer near you. © 1993 Media Vision, Inc., 3185 Laurelview Court, Fremont, CA 94538. (510) 770-8600. Fax: (510) 770-9592. Pro AudioStudio and Pro 16 Multimedia System are trademarks of Media Vision, Inc. Any other trademarks are owned by their respective holders. Any and all bundled software subject to change without notice.

Circle 145 on reader service card

(continued from page 244)

named in \S_LIST. Cell \S_CT is the counter cell—it starts at zero in order to supply the proper offset number to the @INDEX function in B11.

In B11, {let\S_SHEET,@index (\S_LIST,0,\S_CT)} is the first statement in the subroutine \S_MOVEIT. It copies the name of the current sheet, denoted by the @INDEX function, into the variable cell \S_SHEET (B21).

The statement {goto}{\S_SHEET}~{let \S_DELETE,@cellpointer("coord")} in cell B12 records the address of the sheet to be moved in the variable cell \S_DELETE. The statements {goto} @MACROS~ in B13 and /wisa~ in B14 insert a new, blank sheet B: just after the macros sheet.

B15's /m{\S_SHEET}~~ moves the current country sheet, whose name appears in \S_SHEET, into the new blank sheet. In B16, {goto}{\S_DELETE}~{ns}/wds~ returns to the empty sheet left by the previous Move command and deletes it. The {ns} (next sheet) command is necessary because the sheet address was moved back one layer by the insertion operation in B14.

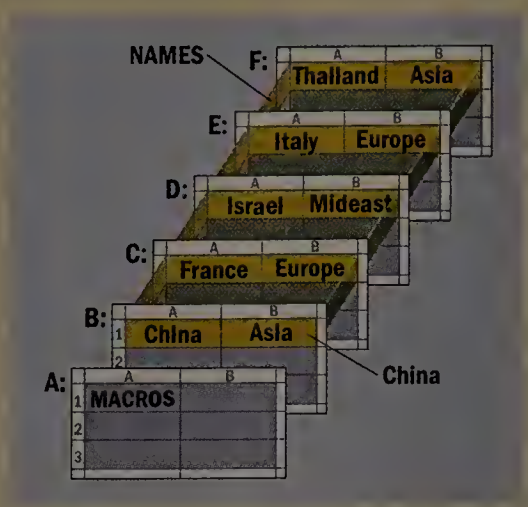


FIGURE 2: TO SET UP SHEETS FOR SORTING, name the active area of each sheet after the label in cell A1 and put the sort key in cell B2.

The macro is pretty basic. As a macro challenge, you might add a menu that lets you select the sort key to permit sorting by country or region.

and enter **0**. Select *Pg-Length* and enter **60**. Use the Header and Footer options to specify your header and footer text, if any. To specify the size of your printed graph images, select *Print•Printer•Options•Advanced•Image•Image-Sz•Length-Fill* from the Print Options menu and enter **26**. Then press **<Esc>** three times to return to the Print menu.

To print the graphs, select *Image•Named-Graph* and select the graph you want at the top of the page. Select *Align* to start a new report, then *Go* to send the first graph to the printer. Select *Line* twice to put some space between the graphs. Then select *Image•Named-Graph* again and specify your second graph. Select *Go*, then *Page*, and you now have two graphs on one page and a thankful tree.

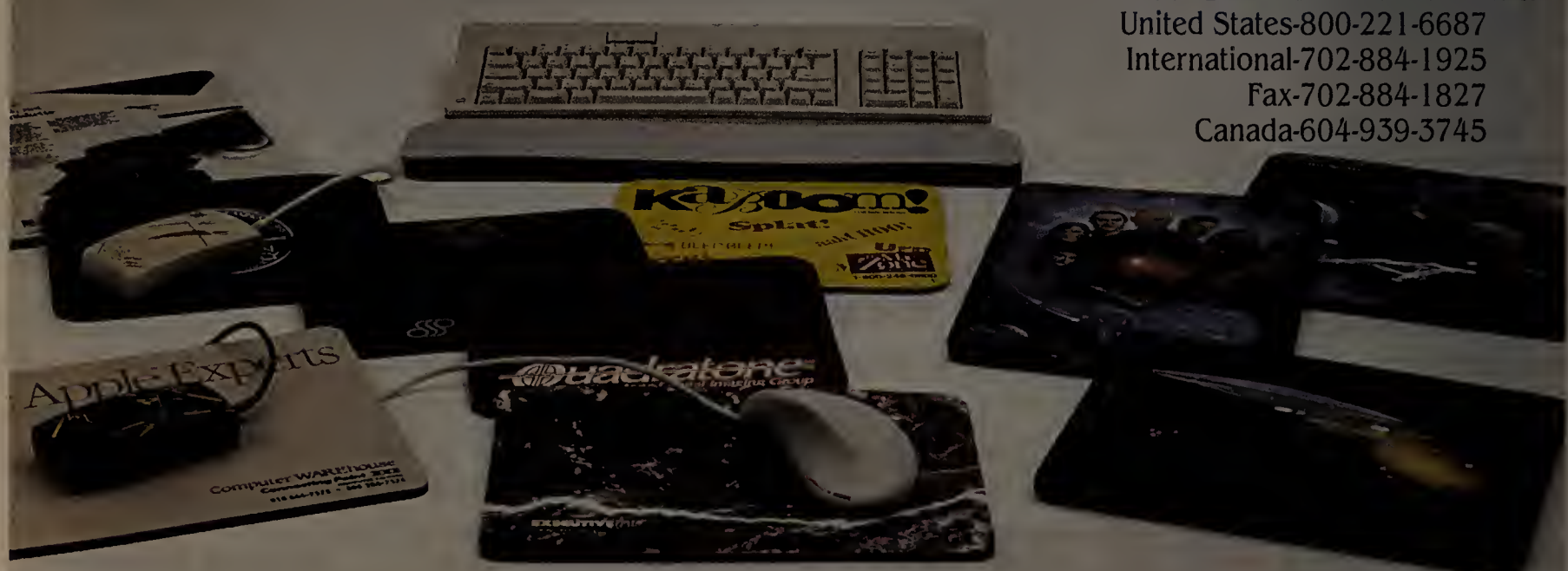
By Richard Scoville

PC World *contributing editor Richard Scoville is a software training consultant in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions. See page 12 for contact information.* ■

A Pad for Everyone!

Moustrak customizes mouspads, wristpads, and graphic pads. And now available is our new line of Star Trek® graphic mouspads and Colani and Fancy mice. Dealers call for a display sample (custom orders in quantities of 50 pc. or more) –
retail price for our graphic pads ranges from $14.95 to $16.95.

MOUSTRAK™ INC.
United States-800-221-6687
International-702-884-1925
Fax-702-884-1827
Canada-604-939-3745



STAR TREK is a Registered Trademark of Paramount Pictures

Circle 143 on reader service card

Around the world over nine million businesses share a common practice. They back up and store important data on quarter-inch data cartridges. And the brand they choose most is 3M. For good reason.

3M data cartridges are built for reliability—from the tape formulation to the cartridge itself. Whatever capacity you need—formatted or unformatted—3M cartridges are ready to save the day with proven performance. That's why more businesses protect important information on 3M brand data storage products than any other brand in the world. For more information and your free "Data Security Handbook" call 1-800-888-1889, ext. 43.

The common denominator of business around the world.

3M data cartridges require compatible drives. © 3M 1993

3M *Reliability*

Circle 208 on reader service card

WORD PROCESSING Q & A

Stepping Back in WordPerfect for DOS

Q I recently found myself in an embarrassing situation when I tried to show a WordPerfect 5.1 file to a client. I had saved the file to a floppy disk and taken the disk to my client's office. At the remote site, the only version of WordPerfect they had was 5.0, and I received an error message when I tried to load the file. How can I avoid this situation in the future?
Vukani Ntombela, New York

A What happened to you isn't uncommon. When applications add new features, older versions of the same program often are unable to read files created by the latest versions. So if you take a file on the road, you have to be careful to store it in a format that can be read by whatever version of the application you may encounter. Fortunately, that's easy to do.

First, use the Text In/Out feature in WordPerfect 5.1 to save the file in a format version 5.0 can read. To do this, load the document into WordPerfect 5.1, then press **<Ctrl>-<F5>AW**, type in the file name for your new file, and press **<Enter>**. This file will load properly in WordPerfect 5.0. All ordinary formatting, such as fonts, pagination, columns, and margins, will remain in place.

You can hedge your bets even further by saving an additional, generic ASCII copy of the document, which can be read by any word processor you might encounter. To create the ASCII file, load the WordPerfect 5.1 document, press **<Ctrl>-<F5>AG**, enter a new file name, and press **<Enter>**. Be careful to use different file names for the two versions of the document. While the ASCII file won't preserve your formatting, at least you'll be able to read the text in any word processor.

Font Madness in WordPerfect 5.2 for Windows

Q I recently switched from WordPerfect 5.0 for DOS to WordPerfect 5.2 for Windows. I like the new tools I have available, especially the TrueType fonts in the Windows printer drivers. But when I open WordPerfect for DOS documents in the Windows version, strange things happen to my fonts.

When I open an old document that uses Bitstream Dutch fonts in the Windows version, the font changes to something called Broadway Engraved, which is not what I want. The TrueType Times New Roman font is more like the original Dutch font, so I'd like my old documents to use New Roman in the Windows version. Is there a way to tell WordPerfect for Windows to make the switch automatically?
Michael Richards, Kaneohe, Hawaii

A Strange as it may seem, WordPerfect 5.2 has no built-in font conversion table. The problem is compounded by WordPerfect's two types of printer drivers. You could use the old DOS printer drivers, but most users opt for the Windows drivers to get access to all the low-priced TrueType fonts. However, since WordPerfect doesn't offer a way to convert fonts intelligently when you load an older file, you'll have to live with a workaround solution:

Start by loading the document in question into WordPerfect 5.2 for Windows, but don't move the cursor, since you want your font change to affect the document from the very beginning. The fastest way to change the font for the entire document is to press **<Ctrl>-<Shift>-<End>** to highlight the whole document, and then click the *Font* button or select *Font•Font*, choose the font you want from the Font list, and click *OK*. Press **<Ctrl>-<Home>** to return the cursor to the top of the document. Only the font will change; italics and boldfacing will remain as they are.

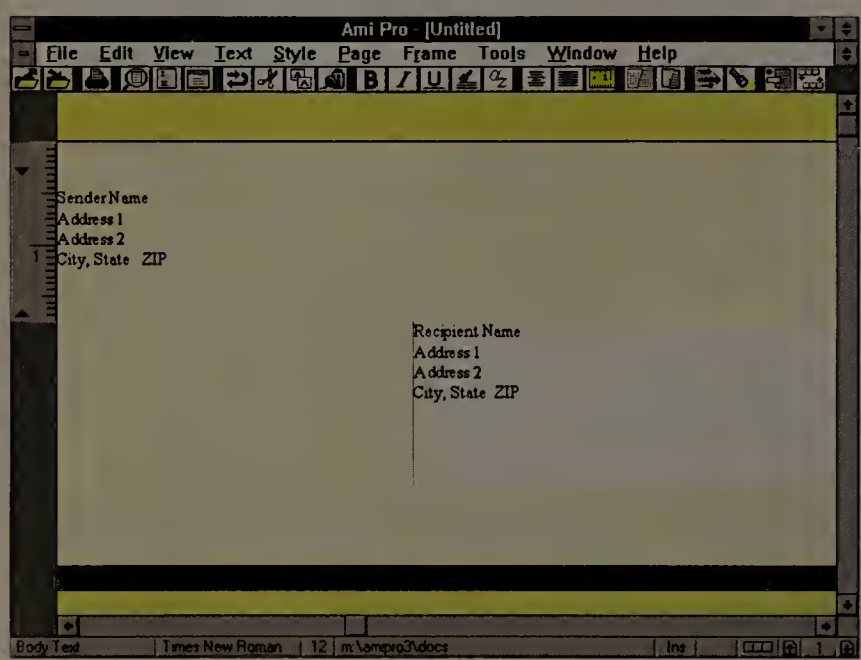
To change fonts in discrete sections of the document rather than set one font for the entire document, you'll have to select individual areas of text and repeat the process. If you know that you'll need to perform this operation often, consider recording your keystrokes in a macro for faster operation.

Realigning Envelope Addresses in Ami Pro 3.0

Q I use Ami Professional 3.0 with a Panasonic KX-P2180 printer. When I print envelopes with Ami Professional's envelope option, half of the first line of the return address is cut off. Do you have any solutions?
Daniel Lord, Frederic, Michigan

A The answer is simple, and it really applies to anyone who wants to alter Ami Pro 3.0's envelope layout. What's happening is that the stock envelope layout has the first line of the return address outside the printable area for your particular printer. All you have to do to remedy this is move the return address down a bit.

To accomplish this, fire up Ami Pro, and then select *File•New*. In the 'Style sheet for new document' list box, choose *Envelope-with return address area;* _envelop.sty will appear in the



IT'S EASY TO ALTER THE LAYOUT of envelopes in Ami Pro to make your return address print properly, then save the layout as a style sheet.

At just 11.5 x 9.5 x 2" and 5.5 lbs., the PanelBook is the smallest LCD panel ever, yet still has all the features.

Introducing the PanelBook™ 550 from In Focus Systems.® An LCD panel should fill the room. Not your briefcase. That's why we developed the new PanelBook.

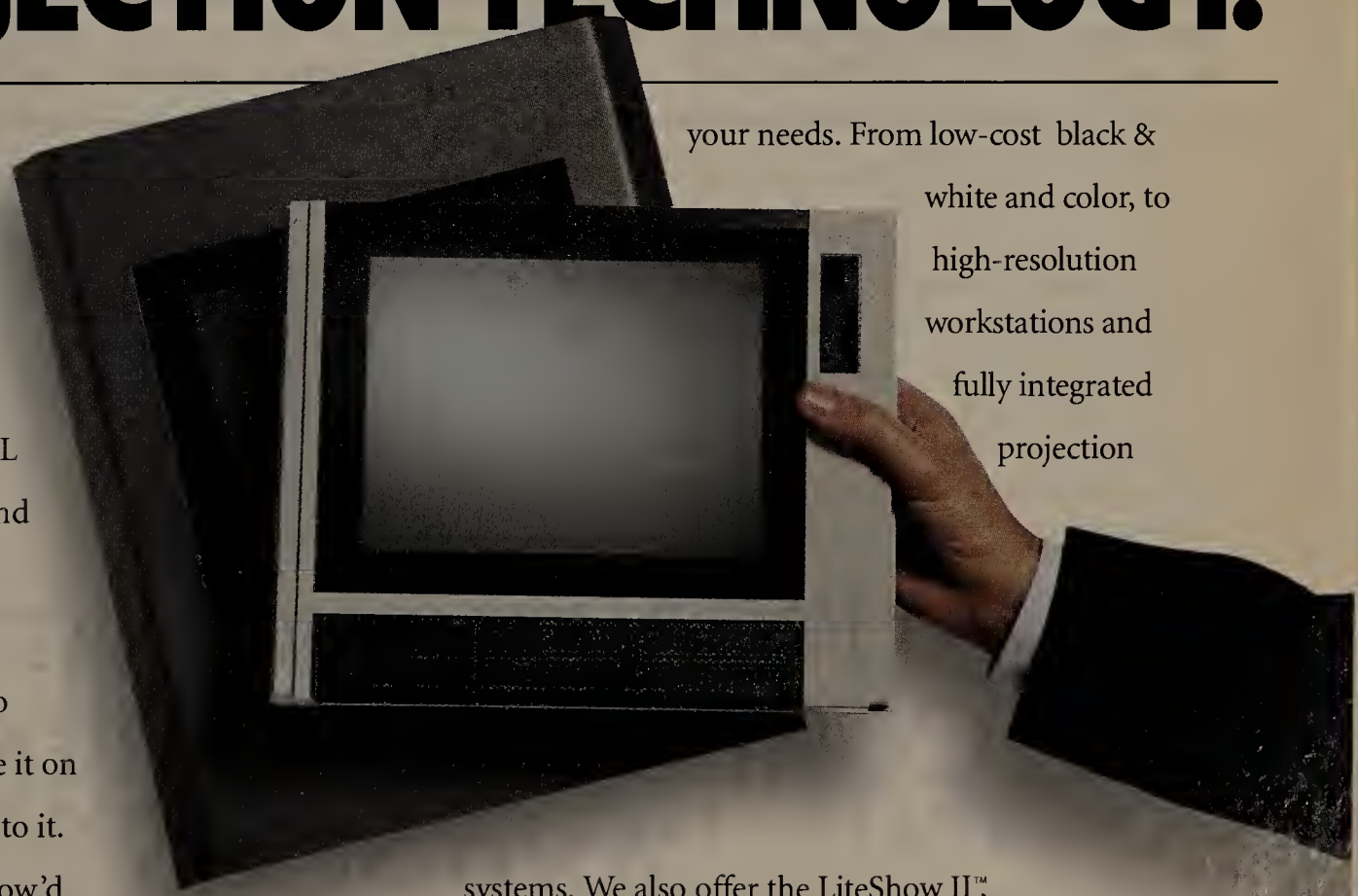
It's the smallest and most convenient LCD projection panel ever. Up to 40% smaller than most panels.

The next-generation active-matrix LCD panel. Keep the features. Lose the weight. With the new PanelBook, you don't give up anything. It's fully featured with integrated data and video.

Inside, you'll find a drawer that expands the panel to full size. It also makes a handy place to store the wireless remote.

Another innovation from the leader in LCD technology. In Focus Systems offers a complete family of LCD projection solutions for all

ANNOUNCING A VERY SMALL BREAKTHROUGH IN LCD PROJECTION TECHNOLOGY.



So it projects from simple presentations to full-blown multimedia. In 1.4 million colors at 640 x 480 resolution.

For world travelers, the PanelBook supports NTSC, PAL and SECAM video standards and has a universal power supply.

As easy to use as it is to carry. Setup is a snap. Just plug it into most any PC or Mac, and place it on an overhead. That's all there is to it.

The secret is in the drawer. How'd we make it so small? We started with a 9.4" LCD and an innovative design for the future. Unique optics project the PanelBook's image to about the same size as much larger LCDs.

your needs. From low-cost black & white and color, to high-resolution workstations and fully integrated projection systems. We also offer the LiteShow II™, our exclusive presentation-management system. Our new PanelBook just happens to be one of our biggest breakthroughs. Or would that be the smallest?

FOR MORE INFORMATION & A FREE PRESENTER'S IDEA GUIDE, CALL 1-800-327-7231.

InFocus®
S Y S T E M S

©1993 In Focus Systems, Inc. 7770 SW Mohawk Street, Tualatin, Oregon 97062. Phone (503) 692-4968. Fax (503) 692-4476. In Europe: Planetenweg 91, 2132 HL, Hoofddorp, The Netherlands. Phone 31 (0) 2503 23200. Fax 31 (0) 2503 24388. In Focus Systems is a registered trademark and PanelBook and LiteShow II are trademarks of In Focus Systems, Inc. All other products are trademarks of their respective holders.

Circle 132 on reader service card

File Name field at the bottom of the dialog box. Click on the Run Macro check box to turn it off, but leave the With Contents box checked. Click *OK* to load the style sheet for editing. You'll see your cursor in a box on the envelope layout. Scroll horizontally until you can see the return address block. Click to the left of the first line of the return address block, the line that reads 'Sender Name'. Now, press **<Enter>** to move the line one line lower on the envelope.

To save your changes, select *Style•Save as a Style Sheet.* In the dialog box that appears, leave all the fields as they are and then click *OK.* When you're prompted, confirm that you want to overwrite the existing style sheet, and you're finished. From now on, Ami Pro's envelope feature will print your return address without cutting off the first line.

You can employ the same technique to modify any other aspects of the envelope style sheet. While you have the _envelop.sty file open, you can use Ami Pro's *Style•Modify Style* dialog box to alter fonts, line spacing, and any other attributes of the basic envelope to produce a customized layout. Just make sure that you don't change any of the text on the envelope. Ami Pro uses this exact text as variables in its envelope printing feature.

Printing the File Name in WinWord

Q I would like to include the file name for each Word for Windows 2.0 document I print somewhere on the printout itself, without having to type the information. That way, when I need to reload the document in the future, I can find the file name right on the printout instead of having to search through scores of cryptic file names on the computer. Can Word for Windows do this?

Tracy McKeel, Kingston, North Carolina

A While not every word processor has this capability, WinWord does. It's common practice in many offices to print the file name below the signature block, to make finding the files easier later on. Here's what you should do:

First, place your cursor where you want the file name to print in your document. Then select *Insert•Field.* In the dialog box that appears, choose *File name* from the Insert Field Type list, then click *OK.* Your document's current file name will appear at the cursor location.

That's just part of the solution. For documents with multiple versions, the file name in the text will remain unchanged unless you update it, even if you save the file with a different name. To update the file name field in a document you've renamed or opened and saved with a different file name, highlight the file name text in the document and press **<F9>**.

To ensure that you always have the correct file name on your printouts—even if you forget to update the field manually in the file—select *Tools•Options.* In the resulting dialog box, click the *Print* icon in the Category list, then select the Update Fields check box in the Printing Options category. Click *OK* to make this the default. Now, whenever you print any document in WinWord, all its fields, including your file name field, get updated first.

PC NETWORKING IS COMPLICATED, EXPENSIVE AND SCARY.

©1993, Coactive Computing Corporation. Coactive, Coactive Connector and The Do-It-Yourself Network are trademarks of Coactive Computing Corporation, Belmont, CA. All rights reserved. All other trademarks are the property of their respective owners. *Exclusive of cabling time, which depends upon your office size and layout.

Two Word for Windows Questions With the Same Answer

Q I really like the tool bars in Word for Windows 2.0, but they're limited in size. Is there any way I can have more than one tool bar so I can use different sets in different situations?
Richard Mabry, Pasadena, California

Q Can Word for Windows format a document for printing as a folded and stapled booklet? Since the page order in such a booklet doesn't follow a normal order, it's difficult to lay the booklet out.
Victor Raybaud, Eastpointe, Michigan

A I usually answer questions one at a time, but both of these have the same answer. WinWord can't satisfy either request; what both of you need is an add-on program, Word for Windows Office Power Pack 2.0, available from Pincliffe International.

WOPR allows you to set up customized tool bars, which you simply load as if they were normal WinWord documents. It also includes a system for reformatting any document for printing as a booklet. But that's not all. WOPR, which sells for $49.95, also offers improved envelope printing plus a raft of handy macros for WinWord. Contact Advanced Support Group, 800/659-4696, 314/966-1833 (fax). Since WOPR is a shareware program, you also can download a trial copy on PC World Online. Look for WOPRA.ZIP and WOPRB.ZIP.

Informed Editing in Word

Q My job requires me to edit other people's work in Word 5.0. Some writers use multiple spaces rather than tabs, or press **<Enter>** to get a new line in a paragraph instead of just letting Word wrap the words. It would help if I could see the actual codes, as you can in WordPerfect.
Everett Wilson,
Palm Springs, California

A While I can't give you WordPerfect's Reveal Codes window in Word 5.0, I can show you how to see most of your co-workers' keystrokes. With Word running, press **<Esc>0**, tab over to the 'show non-printing symbols' field, select *All*, and press **<Enter>**. You'll see the difference immediately. Spaces show up as little dots, tabs as arrows, and paragraph endings as standard typographers' paragraph symbols.

Other special codes, such as new line codes (**<Shift>-<Enter>**), nonbreaking spaces, hidden text markers, and optional hyphens, display their own screen characters in Reveal Codes mode, which makes it easy to find and edit them. As with other Word options, this display option becomes the default when you start Word.

Note: Word 5.5 users can do the same thing by selecting *View•Preferences*, then checking the boxes in the Non-Printing Characters section of the dialog box. Word for Windows users can select *Tools•Options* and check the All box in the Non-Printing Characters section of the dialog box.

By George Campbell

George Campbell is a contributing editor for PC World. Word Processing *welcomes your questions. See page 12 for contact information.* ■

Introducing the Coactive, Do-It-Yourself Network.

Now—in less than 5 minutes—you can connect your computer to a network.

Without sweating through a complex installation process.

Without even opening your PC.

All it takes is the new Coactive Connector. Just plug one Connector into

With the revolutionary Coactive Connector, installing a PC network is as easy as snapping in a phone cord.

Unlike other inexpensive solutions, a Coactive network gives you the file-and printer-sharing power of a real network. Without draining your PCs' RAM. The secret is a 32-bit microprocessor inside each Connector that handles all the networking tasks—freeing up your PCs to concentrate on your real work.

And since Coactive is based on industry-

IN 5 MINUTES WE CAN CHANGE ALL THAT.

each of your PCs and you're networked.

In fact, you can even connect an old PC AT running DOS to a 486 screamer running Windows. And link both of them to a Macintosh.

Everything you need is in the box—hardware, software, cabling—at a cost of only about $149 per PC.

There's nothing new to learn. You'll use familiar computer commands like "copy" or "drag and drop" to use the network.

And you won't have to become a "network administrator." Because our CoAssistant software does the network diagnosis and troubleshooting for you.

standard technology, you're not locked into a proprietary hardware system.

Plus, don't forget that a Coactive Connector is so easy to install that we guarantee you can do it in 5 minutes.* Or your money back.

So, if you've got from 2 to 32 PCs to connect, visit your favorite dealer today. Or call 1-800-825-2NET (800-825-2638) and ask for extension 102 to order direct.

If you think networking has to be complex and costly, give us five minutes. And we'll give you a network. Guaranteed.

The Do-It-Yourself Network.™

Circle 18 on reader service card

WINDOWS Q & A

Do-It-Yourself Program Manager

Q I use Program Manager to launch documents. But Windows won't let you attach long (i.e. descriptive) labels to icons. Is there a work-around?
Kaye Justice, Memphis

A Afraid not. The Description text box in the Properties dialog box is limited to 40 characters. If that's not enough, you can go Windows one better and create a custom Program Manager that allows icon labels of any length.

The secret to this involves creating a file and inserting icons that can run programs or load your documents—icons that you can label to your heart's content. You can create this file in any OLE-capable application—such as Write or Excel—with the Windows Object Packager utility.

Let's walk through the process with Write. Launch Write and select *Edit•Insert Object*. Select *Package* from the Object Type list and click *OK*. This launches Object Packager, which will function as your Program Item Properties dialog box. From Object Packager select *Edit•Command Line* and type in the drive, path, and name of the document or executable (EXE) file you want to run, then click *OK*.

To give the file an icon, click Object Packager's *Insert Icon* button. By default, you're offered icons embedded in PROGMAN.EXE, but you can type in the name of another file that contains an icon, such as WRITE.EXE, MORICONS.DLL, or any ICO file. For now, select an icon from the list and click *OK*.

Don't label the icon in Object Packager. Instead, select *File•Exit*. When you are asked to update your untitled Write document, click *Yes*. Object Packager closes, and the icon appears in your Write window. To add a label, place the cursor either above or below the icon and type away.

To add other document or program icons to this Write file, repeat the steps listed above, starting with *Edit•Insert Object*. When you're finished, save the Write document using *File•Save As* with a name like **MAIN-GRP.WRI** and add it to Windows' StartUp group so this custom "Program Manager" opens every time you start Windows. To add MAIN-GRP.WRI to the StartUp group, drag the file from the File Manager into StartUp, or select *StartUp*, select *File•New* from the Program Manager, click *Program Item* and *OK*, and fill in the Properties dialog box, remembering to note MAIN-GRP.WRI's drive and path.

The next time Windows loads, MAIN-GRP.WRI will automatically open and display its cache of icons. To start a program or load a document, double-click the icon. To change an icon in the MAIN-GRP.WRI window, select it and choose *Edit•Package Object•Edit Package*.

Although your new launcher has limitations—you can't specify a start-up directory, for example—it can do some things Program Manager can't. You can not only create huge icon labels, but format them with any font or style and search for icons based on a label's contents. You can also resize and move icons. (In Write, use *Edit•Size Picture*, and *Edit•Move Picture* respectively; you are, however, stuck with a one-icon-per-line format.) You can even create icons that launch other files holding icons, in effect, nesting program groups within program groups.

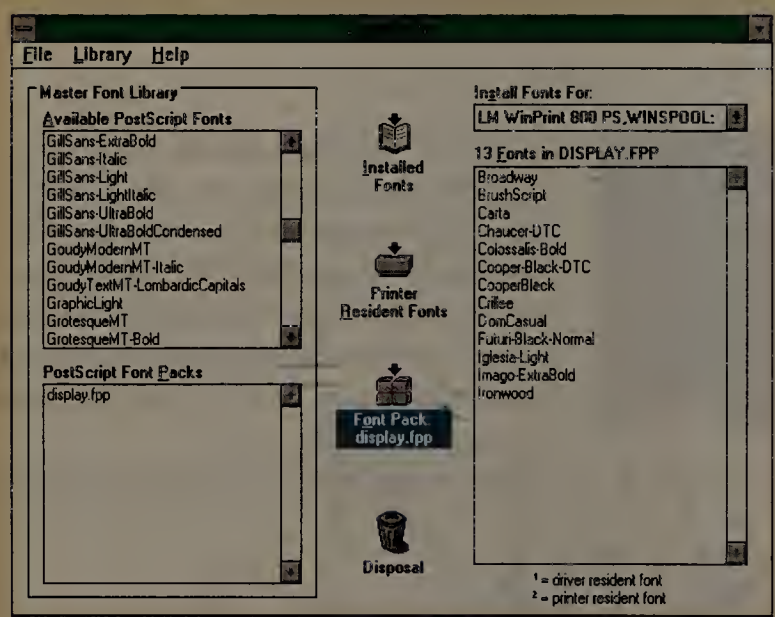
USER GROUP TIP

Quickly Add an Icon

You may know that to change an item's properties quickly in Program Manager, you hold down the <Alt> key while double-clicking on the icon (from the keyboard, highlight the icon and press <Alt>-<Enter>). Less well known is how to create a new item quickly: Hold down the <Alt> key and double-click on an empty space in your Program Manager group, then fill in the resulting dialog box.

Rob Weimer
Capital PC User Group

Windows Toolbox



Tired of sorting through all your Windows typefaces? Miffed at how your system drags? FontMinder 1.1.1 helps you manage a swarm of TrueType and PostScript Type 1 fonts by letting you install and uninstall specific font groups or "packs" on the fly. This makes it a snap to call on only those fonts you need for a given project. You can also preview typefaces, print a list of resident fonts, and more. FontMinder's drag-and-drop interface is so simple and elegant, you'll be adding new fonts or removing old ones instantly. The program is a boon for desktop publishers and presenters, or anyone with multiple printers. FontMinder supports Adobe Type Manager 2.5. Available from Ares Software; $79.95; 800/783-2737, 415/578-9090, 415/378-8999 (fax). Reader service no. 679

Lotus CBT Tutorials

Announcing New Computer Based-Training Tutorials for Lotus cc:Mail Users!

Just slip a Lotus CBT disk into your PC. An interactive window on your screen guides you through each operation while the background shows you what happens. You'll get product-specific, hands-on training on Lotus software. It's quick and easy!

Only $49.95

To Order Now, Call

1-800-824-5520

or fax 410-543-2921

Lotus Publishing Corporation
P.O. Box 1743, Salisbury, MD 21802

Lotus cc:Mail® 2.0
The latest release of cc:Mail software

Lotus cc:Mail® 2.0 Remote*
The latest release of cc:Mail for remote software users

• Available late summer
© 1993. Lotus Publishing Corporation. Lotus Publishing is an IDG Communications Company. Lotus cc:Mail 2.0 and Lotus cc:Mail 2.0 Remote are registered trademarks of Lotus Development Corporation.

PTA3B

Limited Time Offer!

*Buy One Lotus Book Get the Second for Half Price**

Only Lotus Books are produced in close collaboration with the software experts at Lotus Development Corporation. Written clearly and concisely in plain English, these guides will be invaluable when you need it most. *Limited time offer so order today!*

To order call

1-800-824-5520

or fax 410-543-2921

Lotus Publishing Corporation
P.O. Box 1743, Salisbury, MD 21802

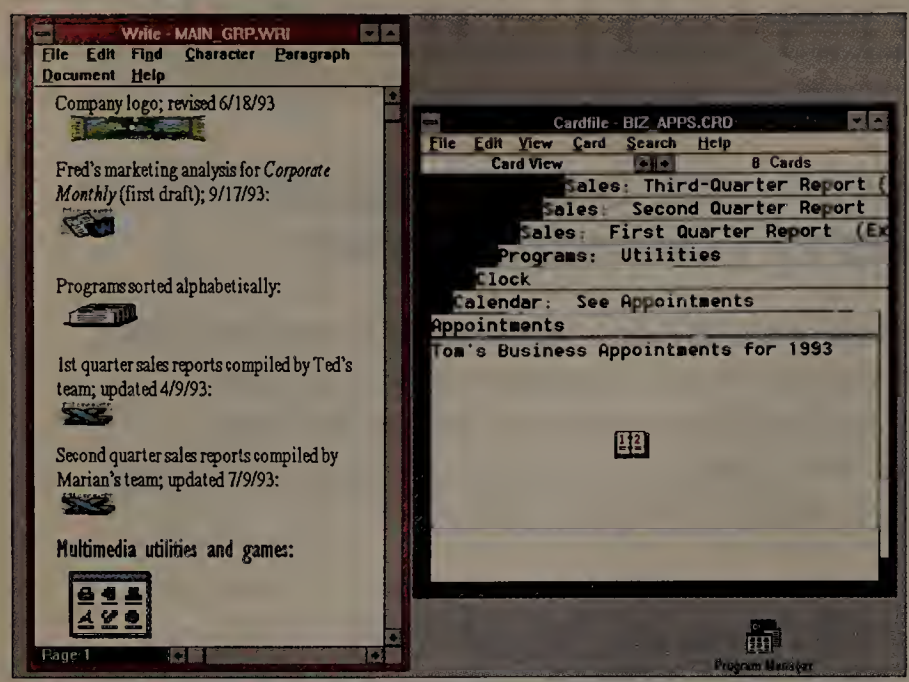
Lotus Book	*List Price*
• Lotus Guide 1-2-3 for Windows	*$24.95*
• Lotus Guide to 1-2-3 Release 3.4	*29.95*
• The Lotus Guide to 1-2-3 Release 3.1	*24.95*
• The Lotus Guide to 1-2-3 Release 2.4	*26.95*
• The Lotus Guide to 1-2-3 Release 2.3	*24.95*
• The Lotus Guide 1-2-3 for Macintosh	*26.95*
• Start Here with 1-2-3 for Windows	*19.95*
• Start Here with Lotus 1-2-3	*19.95*
• Start Here with 1-2-3 for the Macintosh	*19.95*
• Networking with 1-2-3	*21.95*
• Personal Finance with 1-2-3 (w/Disk)	*39.95*
• Spreadsheets for Small Business with 1-2-3 (w/Disk)	*39.95*
• Spreadsheet Publishing with 1-2-3 (w/Disk)	*39.95*
• Quick Guide to Financial Formulas for 1-2-3 Users	*24.95*
• Inside 1-2-3 Macros, Third Edition (w/Disk)	*44.95*
• The Lotus Guide to Freelance Graphics, 2nd Edition	*29.95*
• The Lotus Guide to Freelance Graphics for Windows	*29.95*
• Business Writing Ami Pro	*26.95*
• Lotus Notes at Work	*29.95*
• Lotus Guide to Lotus Works, Version 3	*24.95*

© 1993. Lotus Publishing Corporation. Lotus Publishing Corp. is an IDG Communications Company. Lotus is a registered trademark of Lotus Development Corp.

* Half price applies to book of lower value.
These books are not returnable due to this special offer.
Please add $3.95 per book for shipping and handling.

PBA3

LOTUS BOOKS



YOU CAN EASILY CREATE YOUR OWN customized Program Manager, complete with formatted labels and nested groups.

One final caveat: Although you can drag and drop documents and programs into MAIN-GRP.WRI, don't do it. This would *copy* the document or program to your launcher file, making MAIN-GRP.WRI huge. Always use the Object Packager technique described above to create MAIN-GRP.INI's icons.

Easy Access to New Tips

Q I use Notepad to store useful tips I read in the *Here's How* section of *PC World*. Can you recommend a better way for me to save these tips?
Roger L. Ward Sr.,
Montgomery, Alabama

A We sure can. Notepad has some severe file size limitations, which means you will soon be storing tips in multiple files. Even Cardfile would be a better choice than Notepad, because you could quickly scan the index lines of each card for whichever tip you want to read.

But there is a better way: Add tips to existing Windows help files. It's easy. First, pick a file that is closely related to the tip. For example, you might add the "DOS Screens to the Max" tip that appears at right to the Help file that comes with Windows' PIF Editor.

Launch PIF Editor, press **<F1>**, and pick out a help topic related to the tip by clicking on the *Contents* button. In this example, select *Display Usage* under the 'Options for 386 Enhanced Mode' heading.

To add your tip, just choose *Edit•Annotate* and type the tip in the Annotate dialog box—there's room for several tips. When you're finished, click *Save* and a paper clip icon appears next to 'Display Usage'. If you want to view the tip or modify it, just click the paper clip.

Worried about losing the tip? Simply add it to the Bookmark menu while the Display Usage screen is present. Select *Bookmark•Define* and enter a title for your tip, such as **Run all DOS apps full screen**, and then click *OK*.

Repeat the process if you want to reference other tips that are attached to the Display Usage topic. The next time you want to find this tip while in PIF Editor, simply press **<F1>** and select it from the Bookmark menu. You will then be rocketed to the Display Usage topic. Click on the paper clip icon and voilà—the tip will appear in the Annotate dialog box.

DOS Screens to the Max

Q I inherited my 486 workstation from a previous employee who ran all his DOS applications in a window. I want to run them full screen, but I'd rather not use the PIF Editor to change the settings for all these programs. Is there a quicker way to make them run full screen in one fell swoop?
Herb Reagan, San Antonio

A There is. First, make a backup copy of SYSTEM.INI to be safe. Then choose *File•Run* in Program Manager or File Manager, type **SYSTEM.INI**, and click *OK*. Locate the [386enh] section and add the line **AllVMsExclusive=on**. Save SYSTEM.INI, and exit and restart Windows. The new setting forces all your DOS programs to run full screen. But note: You won't be able to put any DOS app in a window, so you can't cut or copy text from it to another app.

Color Schemes to Order

Q I have added a lot of custom color schemes to Windows, and I switch among them frequently. When I open the Color section of Control Panel, however, they aren't listed in alphabetical order. Why not?
Richard Shankly,
Dartmouth, New Hampshire

A Custom color schemes are listed chronologically, not alphabetically, which is why each new scheme you add appears at the bottom of the list. If this bothers you, edit CONTROL. INI. in the \WINDOWS subdirectory. First, make a backup copy of CONTROL. INI. Then, in either Program Manager or File Manager, choose *File•Run*, type **CONTROL.INI**, and then click *OK*.

Locate the [color schemes] section. You'll see all the schemes listed underneath, with each name followed by an equal sign and a bunch of codes that designate your chosen colors. Rearranging these lines will affect their order in your Control Panel list box, so cut (using <Shift>-<Delete>) and paste (using <Shift>-<Insert>) the schemes until you come up with a sequence that's to your liking. Make sure that each scheme starts on a line by itself. If you accidentally delete a carriage return while cutting and pasting, and one scheme runs into the end of another, Windows will generate General Protection Fault the next time you click the Color icon in the Control Panel.

Save CONTROL.INI, double-click the Color icon in the Control Panel, and you will find that your color schemes are in order from A to Z. Naturally, you will have to repeat these steps if you decide to add more schemes later. Happy decorating.

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).* Windows Q&A *welcomes your questions. See page 12 for contact information.*

AWARD-WINNING ACE CACHE SYSTEM

Value-Series

- Intel® 486 processor, 8K cache
- 238-pin ZIF socket for Intel Pentium® Technology Ready Processors
- 4MB (70ns), 64KB cache, AMI BIOS
- Teac 1.2MB and 1.44MB floppy drives
- Quantum 170MB IDE hard disk
- Diamond Stealth 24 Windows Accelerator, w/1MB DRAM, 16.7 million colors
- ADI Microscan 3G, 14", .28dp, 72Hz at 1024x768NI, WYSIWYG color, Flicker-Free, digital control
- 32-bit VESA VL-Bus IDE (2FD/2HD)
- Deluxe Mid-Tower, 250 Watt, 8 bays: 5 Ext: 3 5¼", 2 3 ½"; 3 Int: 3 1/2"
- 2 Serial, 1 Printer, 1 Game port
- Maxi Switch ProKEY-124 keyboard
- Microsoft MS-DOS 6.0, Windows 3.1
- Microsoft ergonomic serial mouse
- Free One-Year On-Site Service

SX-25/33: $1598/1698
DX-33: $1848
DX2-50/66: $1948/2048

Power-Series

- Intel 486 processor, 8K cache
- 238-pin ZIF socket for Intel Pentium Technology Ready Processors
- 8MB (70ns), 256KB cache, AMI BIOS
- Teac 1.2MB and 1.44MB floppy drives
- Quantum 245MB IDE hard disk, 15ms, 256KB hard disk cache
- Diamond Stealth Pro Windows Accelerator, w/1MB VRAM, 16.7 million colors
- ADI Microscan 3G, 14", .28dp, 72Hz at 1024x768NI, WYSIWYG color, Flicker-Free, digital control
- 32-bit VESA VL-Bus IDE (2FD/2HD)
- Deluxe Mid-Tower, 250 Watt, 8 bays: 5 Ext: 3 5¼", 2 3 ½"; 3 Int: 3 1/2"
- 2 Serial, 1 Printer, 1 Game port
- Maxi Switch ProKEY-124 keyboard
- Microsoft MS-DOS 6.0, Windows 3.1
- Microsoft ergonomic serial mouse
- Free One-Year On-Site Service

DX-33: $2298
DX2-66: $2498

Ultimate IDE/VL-Series

- Intel 486 processor, 8K cache
- 238-pin ZIF socket for Intel Pentium Technology Ready Processors
- 16MB (70ns), 256KB cache, AMI BIOS
- Teac 1.2MB and 1.44MB floppy drives
- Promise DC-4030VL IDE caching card, w/1MB cache, 0.2ms access time
- Maxtor 340MB IDE hard disk, 15ms
- Diamond Viper/VLB Windows Accelerator, w/2MB VRAM, 16.7 million colors
- ADI Microscan 4G/LR, 15" Flat, .28dp, 1024x768NI/72Hz, 1280x1024NI/60Hz, Low-Radiation, Flicker-Free, digital control
- Deluxe Mid-Tower, 250 Watt, 8 bays: 5 Ext: 3 5¼", 2 3 ½"; 3 Int: 3 1/2"
- 2 Serial, 1 Printer, 1 Game port
- Maxi Switch ProKEY-124 keyboard
- Microsoft MS-DOS 6.0, Windows 3.1
- Microsoft ergonomic serial mouse
- Free One-Year On-Site Service

DX-33: $2948
DX2-66: $3148

Ultimate SCSI-2/VL-series

- Intel 486DX2-66, 8K cache
- 238-pin ZIF socket for Intel Pentium Technology Ready Processors
- 16MB (70ns), 256KB cache, AMI BIOS
- Teac 1.2MB and 1.44MB floppy drives
- Ultrastor 34F, VL-Bus SCSI-2 caching controller, 32K cache, Bus-Mastering
- Quantum 545MB SCSI-2 hard disk, 256K cache, 11ms
- Diamond Viper/VLB Windows Accelerator, w/2MB VRAM, 16.7 million colors
- ADI Microscan4G/LR, 15" Flat, .28dp, 1024x768NI/72Hz, 1280x1024NI/60Hz, Low-Radiation, Flicker-Free, digital control
- Deluxe Mid-Tower, 250 Watt, 8 bays: 5 Ext: 3 5¼", 2 3 ½"; 3 Int: 3 1/2"
- 2 Serial, 1 Printer, 1 Game port
- Maxi Switch ProKEY-124 keyboard
- Microsoft MS-DOS 6.0, Windows 3.1
- Microsoft ergonomic serial mouse
- Free One-Year On-Site Service

DX2-66: $3798

Ace Cache BusinessPro

- Intel 486DX2-66, 8K cache
- 238-pin ZIF socket for Intel Pentium Technology Ready Processors
- 8MB (70ns), 256KB cache, AMI BIOS
- Teac 1.2MB and 1.44MB floppy drives
- Promise IDE caching, w/1MB cache
- Quantum 245MB IDE hard disk, 15ms
- Diamond Stealth 24, w/1MB DRAM
- ADI Microscan 3G, 14", .28dp, NI
- Deluxe Mid-Tower, 250 Watt, 8 bays: 5 Ext: 3 5¼", 2 3 ½"; 3 Int: 3 1/2"
- 2 Serial, 1 Printer, 1 Game port
- Maxi Switch ProKEY-124 keyboard
- MIcrosoft MS-DOS 6.0, Windows 3.1
- Microsoft ergonomic serial mouse
- Ext Fax/Modem, 14400, w/Winfax Lite
- Talking Technology " BigmOuth": Voice Mail & Calling Processing system
- Texel 3024/BB2 MPC "Business" Bundle: Pro16 Sound card, 11CD s (worth $1K), Texel SCSI CD-ROM, 265ms, 300kb/s Multi-Session Photo CD + Speakers
- Free One-Year On-Site Service

DX2-66: $3998

ServerPro: EISA/VL SCSI

- EISA/VL system board (8 EISA;1 VL)
- Intel 486 processor, 8K cache
- 238-pin ZIF socket for Intel Pentium Technology Ready Processors
- 16MB (70ns), 256KB cache, AMI BIOS
- Teac 1.2MB and 1.44MB floppy drives
- AMI EISA SCSI caching card, w/1MB
- Quantum 545MB SCSI-2 hard disk, 256K cache, 11ms
- Diamond Speedstar, w/1MB DRAM
- ADI Microscan3G, 14", .28 dp,72Hz at 1024x768NI, WYSIWYG color, Flicker-Free, digital control
- Deluxe Mid-Tower, 250 Watt, 8 bays: 5 Ext: 3 5¼", 2 3 ½"; 3 Int: 3 1/2"
- 2 Serial, 1 Printer, 1 Game port
- Maxi Switch ProKEY-124 keyboard
- Microsoft MS-DOS 6.0, Windows 3.1
- Microsoft ergonomic serial mouse
- Free One-Year On-Site Service

DX-50: $3898

System components:

- Hard Disk capacity is uncompressed capacity
- All 486DX-50 and 486DX2-66 systems come with CPU Heat Sink and Fan
- ProKEY-124 is 124-key, programmable
- WYSIWYG: What You See Is What You Get
- Please ask for multi-media and other offerings.

Axik 486DX2-50 (Augest, 1993)

" Axik has dealt another winning hand, with a Best Buy payoff wrappcd up in its last, eminently upgradable sysytem." " It does a superior job of integrating components. The result is a PC that's dream to expand..." " Service and Support are also winners with Axik." " Best of All, we found no fault with Axik's responsiveness or accuracy." " Axik hits the jackpot in the fantastic value of its fast, super-upgradable PC"

" Hardware 200, 1993: FINEST"
Axik 486DX-50 File Server (June, 1993)

Axik 486DX2-66 (May, 1993)

" Fast DOS apps, excellent customer service."
" In everything that really counts-performance and price-it's attractive enough to earn a Best Buy."

Axik 486DX2-66 (March., 1993)

" Even in an excellent field, one system has to be the best, and this is it. Axik climbs to the top by offering great price/performance and customer service."

Editor's Choice
Axik 486DX-33 (Nov., 1992)

Axik 486DX-33 (Nov., 1992)

" Every company starts small. And one of the ways a small company achieves the kind of universal recognition that firms like Dell and Compaq enjoy is by making a solid product at a fair price. If Axik keeps up the good work, household-name status could be just around the corner."

" Honorable Mentions"
Axik 486DX2-50 (August, 1992)

Axik 486DX50 (July, 1992)

" Blows the competition out of door." " Flat-out performance doesn't mean much if you're not getting value in other areas. The Axik 486/WB-50 uses high-quality components..."

Axik 486DX-50 (July, 1992)

" When you put it together, it's hard not to like the Ace Cache. While some buyers may be reluctant to go with a small startup company's computer, in this case, they should not be hesitant. This is a finely crafted manchine made with quality parts. With the Ace Cache, you get great power, performance, and price. You really can have it all".

"#1 Best Price/Performance"
Axik 486DX-50 (June 16, 1992)

Axik 486DX-50 (Feb 24, 1992)

" In databse server tests, the Axik surpassed Dell, the previous leader, by 5 percent in transactions per minute (TPM). The Axik was 4 percent faster than ALR".

Every Axik system is backed by:

- 30 -Day Money -Back Guarantee
- One- year Limited Warranty
- Free One-Year On-Site Service
- Lifetime Toll-Free Technical Support
- Fax Back Technical Support
- 9-Year PC Design, Manufacturing, Quality Control, Customer Service and Support Experience
- Quality Components from name-brand manufactures
- Quality Personnel for Product Assembly and Testing

intel inside

MICROSOFT® WINDOWS™ READY-TO-RUN

Circle 4 on reader service card

Axik Computer, Inc.

Your Business Partner!

1-800-234-AXIK (2945) or Fax: (408) 735-1437

268 Santa Ana Court, Sunnyvale, CA 94086 • Tel: (408) 735-1234 • Fax: (408) 735-1437
Mon-Fri: 8AM-6:30PM, Sat: 10AM-4PM (PST) ***Call for system customization!***

(C)1993 Axik Computer, Inc. All right reserved. All prices, specifications, and configurations subject to change without notice. The Intel Inside Logo, Intel, Pentium and OverDrive are trademarks of Intel Corp Microsoft, Windows, and Windows Logo are trademarks of Microsoft Corp. All other brand and product names are trademarks of their respective companies.

DATA MANAGEMENT Q & A

Sorting by Fiscal Year in Paradox

Q I keep my invoice records in a Paradox table. I designed a report to total my invoice table by calendar year, but I want to see sales totals by fiscal year, along with the start and end dates for each of these periods. I have thought about putting a fiscal year field in the table, but I don't want to bother with keeping it up-to-date.

I'd like to find a way to automate the process. Can I use a PAL script or queries to update a fiscal year field for me? I'd like to enter the start and end dates for each fiscal year on a special form just once and then have Paradox handle the rest. I'd also like to get a report that lists all the invoices before or after the fiscal years I've entered.

Harvey J. Huberts, Jenison, Michigan

A You're right—a fiscal year field is the best solution to your problem, and yes, you can use a PAL script to handle all the drudgery of keeping it up-to-date. With an updated field, it's easy to use reports and queries to get the information you want.

You'll have to do some preparation before the script will run successfully. First, add a field called **Fiscal Year** to your invoice table (which I'm assuming is called INVOICES). This field can be an **S** type (short number) field. Then create a new table called **FISCALYR** containing the fields **Fiscal Year**, **Start Date**, and **End Date**. Fiscal Year should again be an **S** field, but you should type an asterisk (*) after the *S* to make it a key field as well. If you don't make FISCALYR's Fiscal Year field a key, you won't be able to link this table to your invoice table and show fiscal year dates in your report. Start Date and End Date should both be **D** type (date) fields. Now, enter each fiscal year, along with its start and end dates, into this table.

Next, create the script that will fill in the Fiscal Year field for you. Enter the text shown in **FIGURE 1** into an ASCII text file called **FISCRPTS.SC**. Any text editor will do the job; to use the one that comes with Paradox, select *Scripts•Editor•New* if you have Paradox 4.0 and *Scripts•Editor•Write* if you have an older version. Figure 1 assumes your original table is called INVOICES and your date field is called Date; change these labels to match your own table and field names. To run the script and update your table, select *Scripts•Play•Fiscrpts*. FISCRPTS.SC is available on PC World Online.

Once you've run FISCRPTS, you can easily query on fiscal year. To find any exception—invoices that the script was not able to assign a fiscal year to—type the keyword **blank** under the Fiscal Year field in your query.

```
VIEW "Fiscalyr"
COEDIT "Invoices"
SCAN
IF ISBLANK([Fiscal Year])
 THEN dt=[Date]
      fy=BLANKNUM()
      x=MATCH([Date],"../../..",a,b,c)
      MOVETO [Fiscalyr->Start Date]
      LOCATE PATTERN ".."+STRVAL(c)
      IF retval
       THEN IF dt<[Start Date]
               AND RECNO()<>1
             THEN UP
            ENDIF
            IF dt>[End Date]
               AND NOT ATLAST()
             THEN DOWN
            ENDIF
            fy=[Fiscal Year]
       ELSE MOVETO [Fiscalyr->End Date]
            LOCATE PATTERN ".."+STRVAL(c)
            IF retval AND dt<=[End Date]
             THEN fy=[Fiscal Year]
            ENDIF
      ENDIF
      MOVETO "Invoices"
      [Fiscal Year]=fy
ENDIF
ENDSCAN
DO_IT!
```

FIGURE 1: ASSIGN FISCAL YEARS to your invoices with this Paradox script.

You can also design a report for INVOICES with totals by fiscal year: First, select *Group•Insert•Field•Fiscal Year* to create a group band on the Fiscal Year field. Then attach the FISCALYR table to the report using *Field•Lookup•Link*, linking the tables via the Fiscal Year field. Add your summary fields in the Fiscal Year group footer using *Field•Place•Summary*. You can show the beginning and ending dates for each fiscal year by placing the relevant fields from FISCALYR into your report design.

Guarantee Unique Record IDs in dBASE

Q In "Keeping dBASE III Unique" in the April 1993 *Data Management* column, you showed how to set up a hot key to add a new record with a unique ID to a file. Wouldn't it be easier to replace your ten-line program with the following two lines of code?

APPEND BLANK
REPLACE ID WITH RECNO()

Using the new record number as the ID should eliminate the chance of duplicating an ID.

E. E. Staton, Dunwoody, Georgia

A Your approach will work well as long as you never delete records and then PACK your data file. When you use the PACK command to permanently remove records that are flagged for deletion, dBASE lowers the record number for every record after the first one removed. Therefore if your ID numbers are based on record numbers, and you PACK your file, some of your records will end up with record numbers that are smaller than their ID numbers. Because of this, an ID number assigned by taking the value from the RECNO() function might already belong to another record.

The program I printed in the April column was designed to avoid this potential problem. I suggested indexing the data file on the ID field and then using commands that tell dBASE to get the ID number of the last record in the

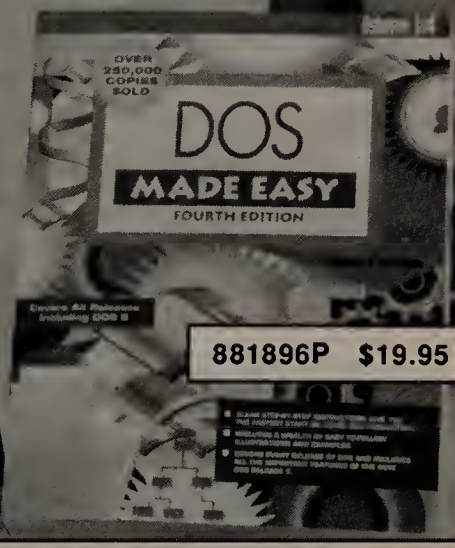
Select any 5 books for only $4.95

(Values to $201.75)

plus 1 BOOK FREE

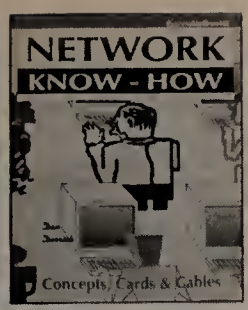
when you join The Computer Book Club®

881895P $24.95

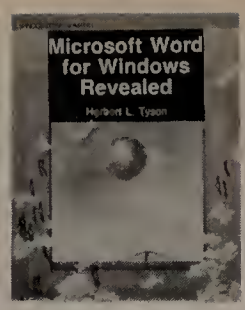


881896P $19.95

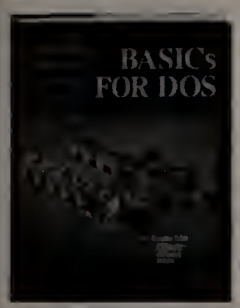
3922P $16.95



881833P $19.95

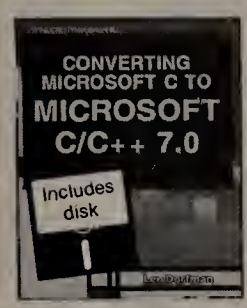


3799P $24.95



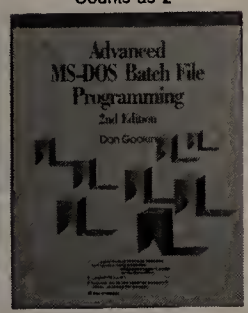
3769H $31.95
Hardcover

4238P-XX $32.95
Counts as 2



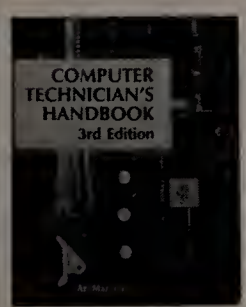
4341P $34.95

881930P-XX $39.95
Counts as 2

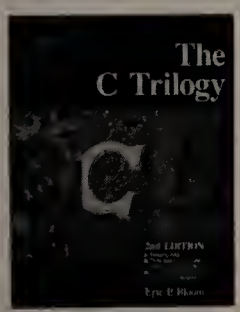


3745P $24.95

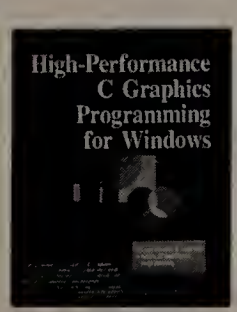
881698P $19.95



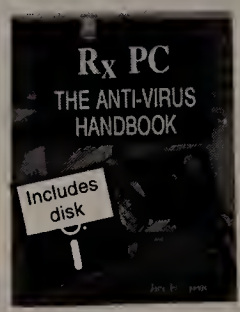
3279P $24.95



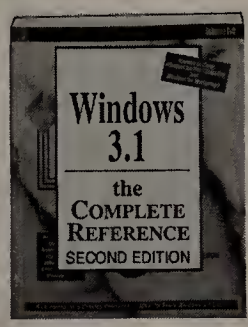
3946P $26.95



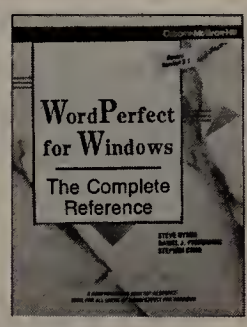
4103P $24.95



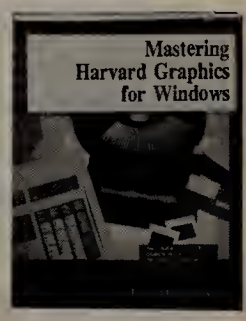
4262H $39.95
Hardcover



881889P-XX $29.95
Counts as 2

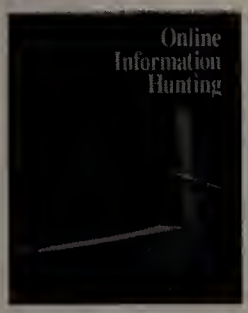


881018P $29.95

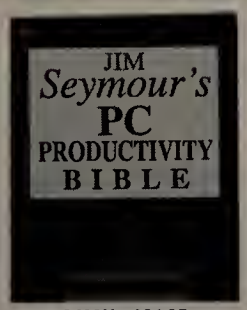


4186P $22.95

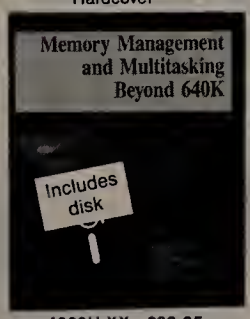
881836P-XX $29.95
Counts as 2



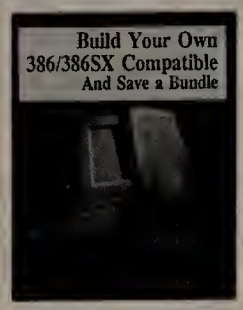
3943P $19.95



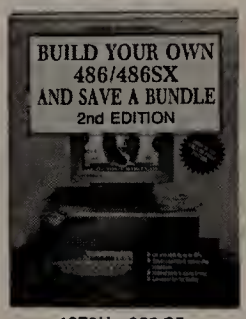
9409H $34.95
Hardcover



4069H-XX $39.95
Counts as 2/Hardcover

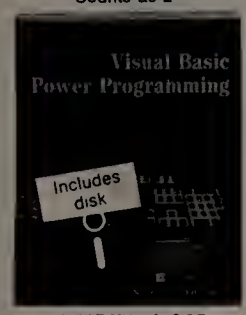


4089P $18.95

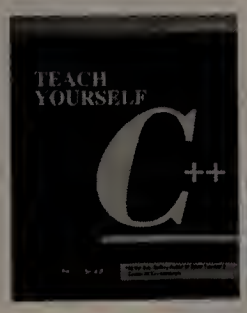


4270H $29.95
Hardcover

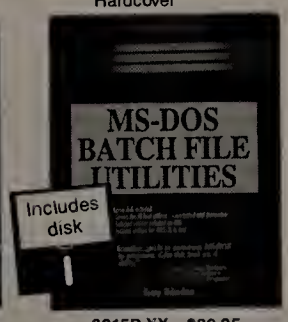
4143P $14.95



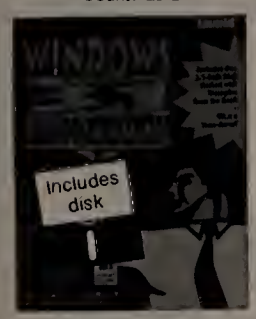
4149P-XX $29.95
Counts as 2



881760P $24.95



3915P-XX $29.95
Counts as 2



881855P-XX $39.95
Counts as 2

881910P $29.95

4072H-XX $39.95
Counts as 2/Hardcover

If card is missing, write to:
The Computer Book Club, Blue Ridge Summit, PA 17294-0820

As a member of The Computer Book Club. . .

. . .you'll enjoy receiving Club bulletins every 3-4 weeks containing exciting offers on the latest books in the field at savings of up to 50% off of regular publishers' prices. If you want the Main Selection do nothing and it will be shipped automatically. If you want another book, or no book at all, simply return the reply form to us by the date specified. You'll have at least 10 days to decide. If you ever receive a book you don't want, due to late mail delivery of the Bulletin, you can return it at our expense. And you'll be eligible for *FREE BOOKS* through our Bonus Book Program. Your only obligation is to purchase 3 more books during the next 2 years, after which you may cancel your membership at any time. PCW993

All books are softcover unless otherwise noted. Publishers' prices shown. If you select a book that counts as 2 choices, write the book number in one box and XX in the next. A shipping/handling charge & sales tax will be added to all orders. ©1993 CBC

FREE BOOK is available through prepay option only.

file, rather than the record number, and increment it to come up with a unique ID for a new record. This way you're sure to get an ID that hasn't been used before, even if you've gotten rid of old records.

Mail Merging With Access and Word for Windows

Q I need to merge Microsoft Access data into Word for Windows documents, and I can't find an easy way to do this, even though both programs are Windows applications available from Microsoft. The documentation suggests copying and pasting, which is hardly what mail merge is all about. Is there a solution?

Eric Rigby,
Fernie, British Columbia, Canada

A The Microsoft Access documentation merely says that you can copy and paste from an Access table into another Windows application, which seems to imply tediously moving your data one record at a time. But if you search Access's on-line help for the keyword *mail merge*, you'll find instructions on creating an entire file of table records that you can use for a mail merge with Word for Windows.

On the Access side, the work is easy. Open the database that includes the table you want to merge. At the Database window (which is not a table view), highlight the name of the desired table and choose *Edit•Copy* or press **<Ctrl>-C** or **<Ctrl>-<Insert>**. This puts a copy of the entire table in the Windows Clipboard.

If you don't want to merge the entire table, you can use a query. Simply design a query with the information you want, name and save it, then select it from the Database window and copy it to the Clipboard as described above.

The next step is to go into Word for Windows and create a data file from the contents of the Clipboard. (Be careful not to exit Access first, or you'll clean out the Clipboard.) In WinWord, choose *File•New* from the menus, select *DATAFILE* as the template for the new document, and make sure that *Document* is selected in the New box. When the new file is up, use *Edit•Paste* or **<Shift>-<Insert>** to paste your data into it. Each record of your database will appear as a line, with the records separated by tabs and the first line showing the field names. You may need to edit this line a little bit because field names with spaces tend to confuse WinWord; simply remove any blank spaces inside field names. Now close the file and save it.

To merge the data, open or create your main document and choose *File•Print Merge•Attach Data File* and the name of your new data file. As you edit the document, you'll be able to insert field names from the data file by clicking the *Insert Merge Field* button. Once you've created this document, you can use *File•Print Merge•Merge* to view or print the results.

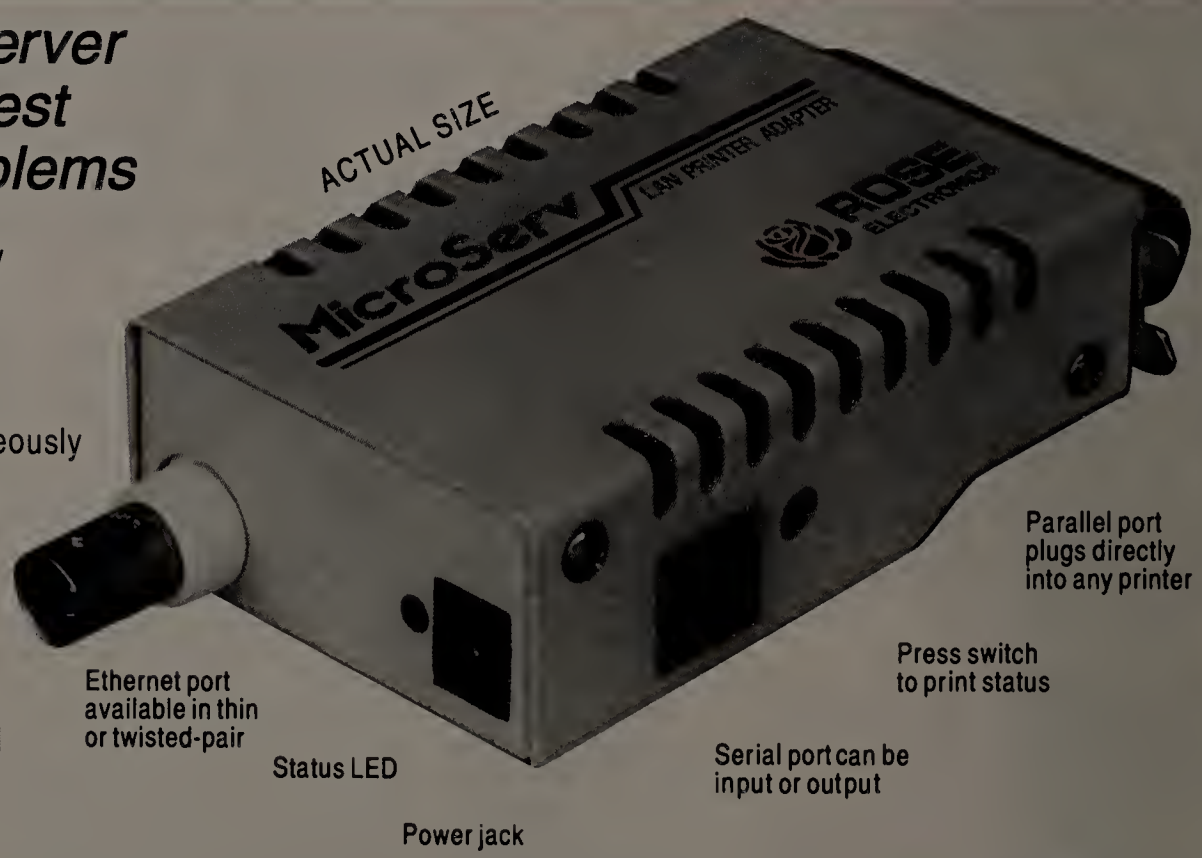
By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and the author of* The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992).* Data Management *welcomes your questions.* *See page 12 for contact information.* ■

GREAT THINGS COME IN SMALL PACKAGES

This powerful print server can tackle your biggest network printing problems

- Connects any parallel printer directly to your Ethernet LAN
- Fully Novell Netware 286 and 386 compatible
- Can attach to 8 file servers simultaneously
- Fast and easy to install
- Combines high-speed printing and exceptional printer control
- Supports encrypted passwords, forms, notify, cancel, and others
- Full one-year warranty and unlimited free technical support
- Made in the U.S.A.



Make the Rose Connection

ROSE ELECTRONICS

10850 Wilcrest Drive • Houston, Texas 77099 • Phone (713) 933-7673 • Fax (713) 933-0044

1-800-333-9343

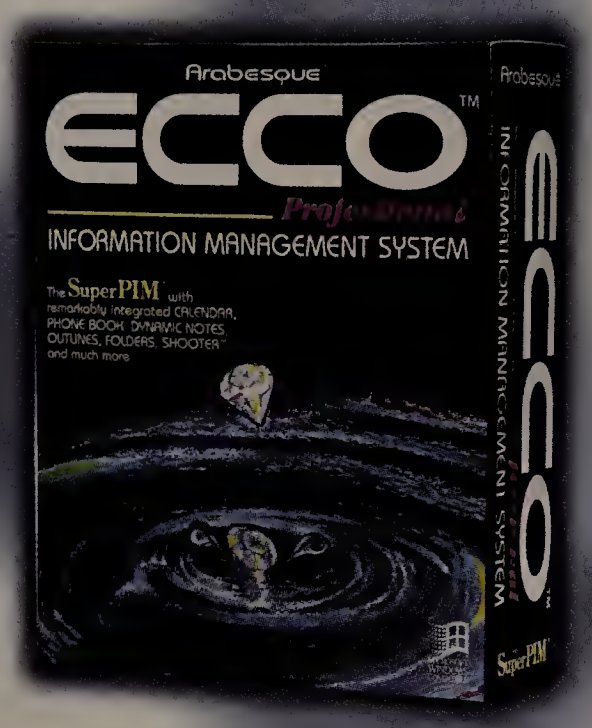
Circle 239 on reader service card

"ECCO Professional is a Personal Information Manager, but that's like calling Michael Jordan a basketball player... You'll find yourself living in it."
—Paul Andrews, Computer Columnist and Co-Author of "Gates," 5/93

"Terrific! Easiest to use. Startling power. This is a program to get excited about."
—Jonathan Blackwood, Windows User, 7/93

"I'm actually putting my life into ECCO. That's how compelling it is... An incredible interface that absolutely positively urges you to tie information together in just the ways you need to view it."
—Kevin Strehlo, Executive Editor, InfoWorld, 5/93

"Best Buy." "For scheduling... for phone book data... for truly powerful personal data management, there's nothing better... The ultimate in linking information."
*—Daniel Tynan, PC World, 8/93**



"ECCO is the most important and unique advance in the category."
—Tim Bajarin, Noted Analyst, Creative Strategies, 5/93

"ECCO Professional represents a new frontier in Windows-based personal information managers."
—Brad Grimes, PC Magazine, 6/93

"The Outlook gives ECCO Professional our Best Buy recommendation."
—Andrew Seybold, Outlook on Mobile Computing, 5/93

We're not the only ones calling it a SuperPIM.™

ECCO™ Professional. Because an organized life is an easier life.

Sure, computers have made certain things easier—writing letters, creating charts, that sort of thing. But what about the rest of your day? Making calls, preparing for meetings, appointments, coordinating projects, and gathering random thoughts—then finding them again?

That's what ECCO, the world's first SuperPIM™ (personal information manager) for Windows is all about.

Introductory offer.
$99
60-day money-back guarantee. Regularly $395.
Call 1-800-457-4243.

ECCO goes beyond traditional PIM and contact manager functionality, giving you a tightly integrated calendar, phonebook, to-do's and outliner. Plus, it lets you add dynamic notes to each entry, which can then be quickly organized and cross-referenced. So you see all your information where you need it, when you need it.

And only ECCO has Shooter,™ letting you send any information between ECCO and other programs. Instantly.

So try it. It won't just change the PIM category—it'll change your life.

Arabesque™ Software, Inc.

©1993 Arabesque Software, Inc. All trademarks are property of their respective owners. *Reprinted with the permission of PC World.

Circle 27 on reader service card

PUBLISHING & PRESENTATIONS MAKEOVER

Those Slippery Slides

Quick: Which has more traps—a golf course or a slide presentation?

Answer: a slide presentation.

Poorly designed slides can put your audience to sleep. A few simple design tricks, however, can help you keep your audience alert and interested. For example, don't include the full text of your presentation on your slides. Use short bulleted items to illustrate and support your points. And don't put too much information on single slides: You'll lose your audience's attention.

The slides shown below come from a half-hour presentation given by James H. Johnson, president of Johnson Direct Advertising, a Redwood City, California–based direct-mail advertising agency to the software industry. Johnson's presentation, nearly 60 slides long, was created in Microsoft PowerPoint. It covers the use of direct mail to launch software products, and he gave it at a meeting of the Software Entrepreneurs Forum, a professional organization.

While Johnson's slides demonstrate his expertise, they work against his presentation. The black-on-white type is stark and uninteresting, there are few graphics to reinforce his statements, and some of his slides have no heading—a critical oversight. In addition, several of the slides crowd too much information or make points that would be more effective if spoken.

We performed our redesign in CorelDraw, a draw package that has recently beefed up its presentation skills greatly, but we could easily have produced it in just about any presentation software package. In revising this presentation, we sought to unify and clarify the message by using the same fonts, colors, and graphics throughout.

The first step was to eliminate the opening slide's map of the United States, since it has little relevance to the subject. We replaced it with an icon of a floppy disk, which ties more closely to the presentation's theme and can be used in other slides as a graphic or as a bullet in text.

We added a graded fill—a standard template in presentation packages—that changes from black to blue to provide a more inviting background. To add even greater consistency, we replaced the original presentation's confusing variety of typefaces with the single sans serif Futura family, using Extra Bold for headlines and a condensed style for body text.

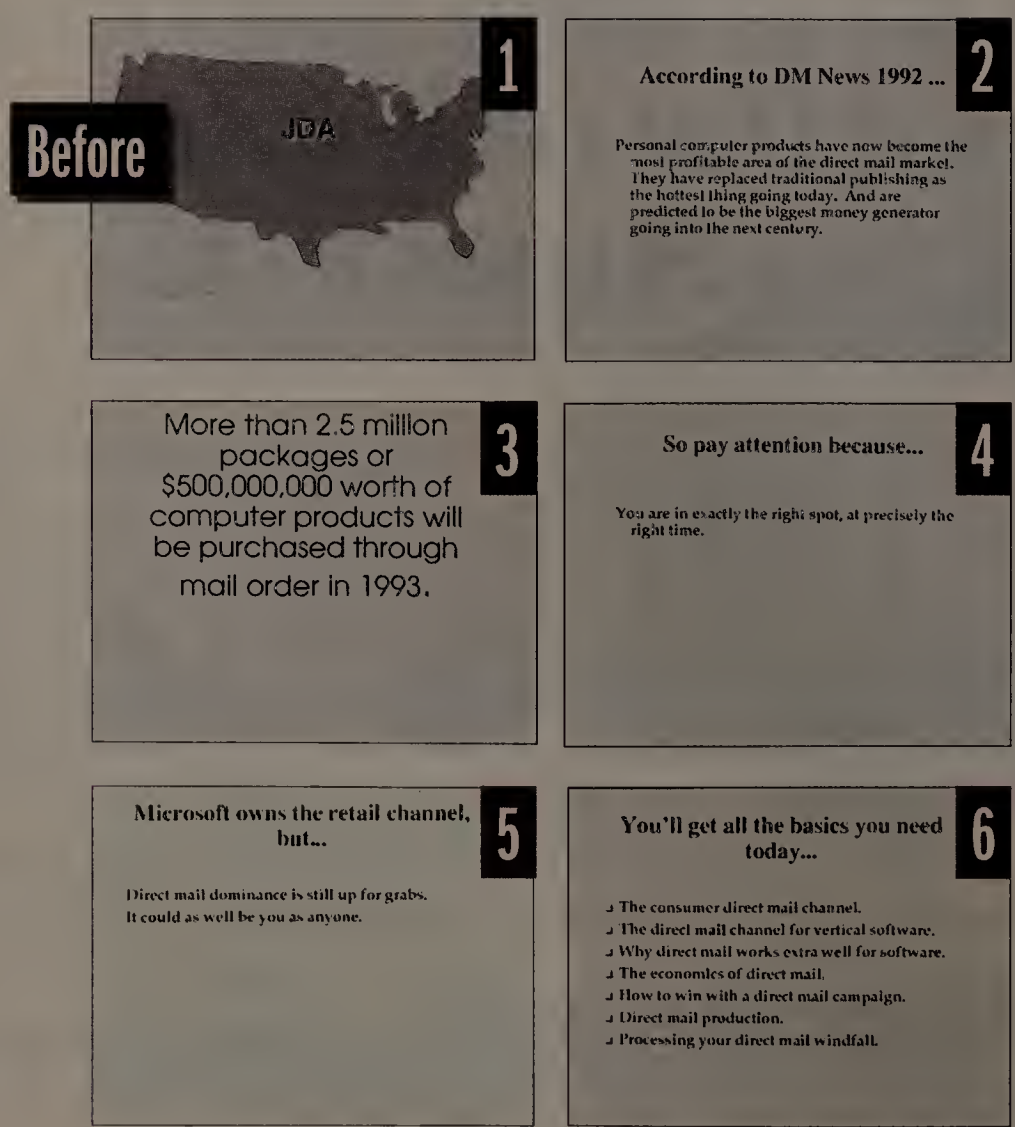
Keep It Simple

Johnson had fallen prey to the common mistake of inserting extraneous information in his slides. We eliminated slide 4 ("So pay attention because") since it conveys no critical information. Slide 6 ("You'll get all the basics"), on the other hand, is crammed with too much text. We broke it into two separate slides that are easier to read.

Easy-to-grasp graphics and commanding headlines help the audience take in a slide's meaning quickly, so we moved important information from the body text into the headings wherever possible. Where appropriate, we added graphics to underscore the speaker's point—the stack of floppy disks in slide 3 and the Microsoft Windows logo in slide 4, for example.

By using headlines, bulleted text, and data charts and giving your slides a clean, consistent look, you'll make your presentations easier to follow and as a result, more persuasive.

By David Brickley and Bronwyn Fryer



The redesign was performed by David Brickley, a designer based in Moss Beach, California. Bronwyn Fryer is a contributing editor for PC World. Publishing & Presentations *welcomes your business document and presentation make-over candidates and your publishing and presentations questions. See page 12 for contact information.*

After

JDA
JIM JOHNSON'S 1992
Software Direct Mail
Marketing Seminar

1 We replaced the map in the original with a graphic created in CorelDraw. The first line is set in 60-point Futura Extra Bold; the remaining text is set in 76-point Futura.

According to
Direct Marketing News 1992:

- Software has become the most profitable product in the direct mail market.
- It has replaced traditional publishing as the hottest thing going today.
- It is predicted to be the biggest money generator going into the next century.

2 We broke the long text of the original into three short bulleted items. We used the floppy disk icon as a bullet, sizing it at 125 percent of the adjacent font size.

Anticipated '93 Mail
Order Software Sales

More than 2.5 million packages of software worth $500 million will be purchased through mail order in 1993.

3 To create the floppy disk graphic, we enlarged the icon by 180 percent, then copied and pasted it 50 times in a vertical stack to give the impression of volume.

Microsoft owns the
retail channel, but...

Direct mail dominance is still up for grabs. It could just as well be yours as anyone's.

4 Adding an easily understood graphic element, such as the Microsoft Windows logo, averts slide-to-slide monotony while underscoring the speaker's point.

You'll get all the basics
you need today...

- The consumer direct mail channel.
- The direct mail channel for vertical software.
- Why direct mail works well for software.

5 To make the slides easier to read, we placed white type on the dark background and replaced the various fonts of the original with a consistent Futura family throughout.

You'll get all the basics
you need today...

- The ecconomics of direct mail.
- How to win with a direct mail campaign.
- Direct mail production
- Processing your own direct mail windfall

6 Give your information to the audience in manageable chunks: We split the seven bulleted items on the original slide onto two separate slides—5 and 6.

Intel's video brings the same easy

Introducing Indeo™ technology and the Smart Video Recorder from Intel.

When it comes to putting video technology on your PC, Intel knows exactly which buttons to push.

Intel's new Indeo™ technology is the first video compression technology that lets you capture and compress video in one single step. (Now that's easy.) And the Smart Video Recorder is the first video capture board that takes advantage of Indeo technology. Which means adding the impact of motion video to your business presentations is faster and simpler than you ever imagined.

Recording with the Smart Video Recorder is as simple as pushing a button. And it's fast. It only takes one minute to capture and compress a one-minute video clip. (Other products take up to 15 minutes.) One-step recording also cuts the Smart Video Recorder's disk space requirements—other systems can require

©1993 Intel Corporation. The Indeo logo is a trademark of Intel Corporation. *Third party trademarks are the property of their respective holders.

technology concept to your PC.

Video for Windows lets you capture, edit and incorporate video into Windows applications.*

up to five times the disk space.

A key component of Indeo technology, scalable performance adjusts playback quality based on your system's processing power. And you don't need special hardware for playback. Scalable performance gives you the best playback possible from the computer you have now, and whatever computer you may use in the future.

You can get started right away, too, because Microsoft Video for Windows* and Asymetrix Compel* and MediaBlitz* software programs are included in the Intel Smart Video Recorder box.

To learn more about Indeo technology and the Smart Video Recorder, call 1-800-538-3373, ext. 1153. Or to receive information immediately, call Intel's automated FaxBACK® service at 1-800-525-3019 and ask for document 9874. Because with Intel, PC video is all fast forward.

intel®

Circle 109 on reader service card

COMMUNICATIONS Q & A

Tips for New CompuServe Users

Q I am new to CompuServe and have found the interface confusing and difficult to use. Also, I'm not sure which forums I should look at first when I explore it, and which services provide the best value. Do you have any suggestions for me?
Aleksei Znamensky,
St. Petersburg, Russia

A Try CompuServe Information Manager for Windows. This program is the most delightful communications software I've seen in a decade of reviewing. Although dedicated to CompuServe only, Information Manager makes roaming the online service as easy as tic-tac-toe, transforming the entire service with festive icons and drop-down menus.

If you're not running Windows, try CompuServe Information Manager for DOS. The two programs are virtually free: You can download a copy of CompuServe Information Manager for Windows by entering **GO WINCIM**. In the United States, downloading the program costs about $10, and you get a $10 CompuServe credit. Better yet, you can order the Windows or the DOS version online by entering **GO ORDER**. The cost is $25, and the program comes with printed documentation and a $25 CompuServe credit.

Unfortunately, both these programs are poky online, especially in the forums. So for reading and replying to forum messages, get a copy of AutoSIG, which is free. You can download AutoSIG from the IBM Communications Library on CompuServe (**GO IBMCOM**). Look in the AutoSIG Library for ATOSIG.EXE, ATODOC.EXE, and ATOADV.EXE.

This simple-to-set-up software will automatically dial CompuServe, download message headers in the public forums that you specify, then log off quickly. Offline, you can specify which messages you'd like to read; then the program will log back on to capture those messages for you.

If you plan to spend more than one hour a month on CompuServe, your best pricing strategy is to sign up for the Standard Pricing Plan at $8.95 per month with the Executive Service Option. Standard Service lets you access a variety of features, including news, daily stock quotes, games, and an online encyclopedia, without incurring hourly CompuServe connect charges. This option requires that you spend $1.05 a month online but gives you access to lots of business databases and news features you wouldn't get otherwise, plus discounts on some business-oriented services.

Spending hours online can get expensive, however. To avoid racking up needless hourly charges, always head to the Basic Services menu as soon as you log on, by either choosing it off the main menu or entering **GO BASIC**. Access any Standard Service features through this menu rather than via alternative routes, which may require toll charges.

To save money while online, print out the free guides to CompuServe navigation and GO commands, which you can access by entering **GO INDEX** and **GO FRE-14**.

Don't forget to check out the IBM Europe forum (enter **GO EURFOR**) to "chat" with friends and receive tips for computing overseas.

For a dazzling library of news, background, and financial data on any publicly held company, head to the Citibank Global Reports menu by entering **GO GLOREP**. At the prompt, enter a period followed by the company's ticker symbol. This service costs $35 per hour in addition to the hourly CompuServe toll fee, which is generally $8.

Japanese Investing

Q I'm interested in finding out about investment opportunities overseas, particularly in Japan. Can you tell me how I can conduct an online search for financial information about Japanese companies?
Dell Warken, Tampa

A Try the Teikoku Databank, the largest business database in Japan. A subset chronicling the finances of 200,000 Japanese businesses is now available in English through Dialog. It's file 502, and access runs $1.80 a minute plus $5 per record accessed. Contact Dialog at 800/334-2564.

You also can obtain faxed information from the database for just $30 per report. Or, buy the entire database on CD ROM for $3200. Contact Teikoku Databank America, 750 Lexington Ave., 28th fl., New York, NY 10022; 212/486-2637, 212/486-2638 (fax).

By Judy Heim

Judy Heim is a contributing editor for PC World *and the editor of* Online Investor, *a newsletter about using online services to track and manage investments.* Communications *welcomes your questions. See page 12 for contact information.*

USER GROUP TIP

Cleaning Out Procomm Listings

My Procomm 2.0 dialing directory is pretty full, so every once in a while I go through it to see which BBS's are worth keeping. Naturally, bringing all my old or rarely used BBS's together makes it easier to weed them out, and Procomm's sort feature lets me do just that. Here's how:

At the directory screen, press ST to sort BBS listings by the total number of times you've called them, SL to sort by the date you last called each one, or SB to sort by baud rate (to find and possibly eliminate any old 1200-bps or, worse, 300-bps boards). In all three cases, the boards you'll want to consider deleting will be at the bottom of the list. Pressing T toggles the display, allowing you to see each listing's total number of calls and last call date.

Alan Blandamer
Capital PC User Group

Beauty And dBASE.

For millions of dBASE developers, this is a fairy tale come true: new CA-dBFast 2.0, the first and only dBASE-compatible database and language for Windows.

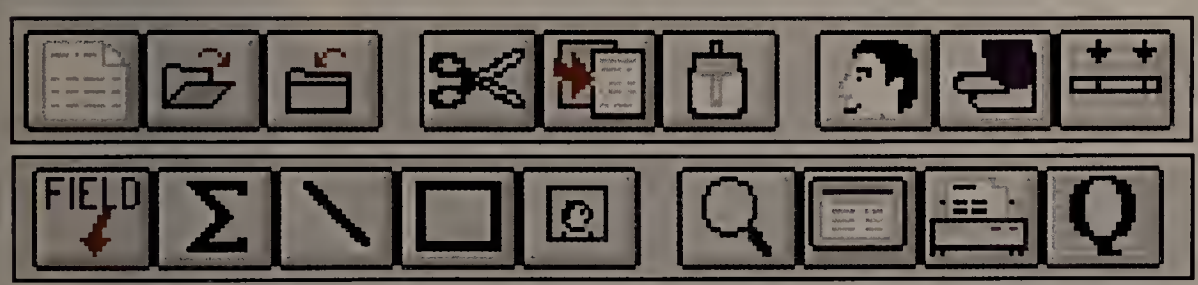
CA-dBFast meets two giant needs: moving existing dBASE applications to Windows *and* developing dazzling new applications in record time. It's the one solution that lets you take advantage of Windows while protecting the huge investment you've made in Xbase technology.

MICROSOFT WINDOWS COMPATIBLE

With CA-dBFast 2.0, you get a proven, stable environment that's more visual and more intuitive than anything you've ever used. And there's no need for Microsoft's confusing, intimidating SDK, so creating applications with CA-dBFast is – true to its name – fast.

CA-dBFast includes Windows interface objects for pull-down menus, push buttons, radio buttons, check boxes, scrolling list boxes, bit-mapped graphics and more.

debugger that's so advanced it lets you watch your source code execute at run time – even Single Step through execution.



CA-dBFast's report writer, CA-RET, lets you mix text, graphics and data to produce great-looking reports in minutes.

The Visual Application Designer (VAD) makes creating pull-down menus, push buttons, radio buttons, check boxes, scrolling list boxes and other Windows objects as easy as "point and click" or "drag and drop." The VAD generates the required source code, saving you hours of complex programming. You also get a

CA-dBFast 2.0 also includes CA-RET – an outstanding Windows-based report writer that lets you mix text, graphics and data on the same report in a full WYSIWYG environment.

Creating great-looking tabular reports, form letters and labels is as easy as using a word processor.

FOR A FREE DEMO DISK, CALL 1-800 CALL CAI, Ext. 190.

With CA-dBFast applications, there are no license fees, royalties or key diskettes to bother with. And recipients of runtime programs don't need CA-dBFast to run the application – just Windows. CA-dBFast is also compatible with CA-CLIPPER, dBASE III Plus, dBASE IV, and FoxBASE.

So whether you want to wake up old applications or build brilliant new ones, there's only one way to marry Windows beauty and Xbase power.

Check out CA-dBFast today.

COMPUTER ASSOCIATES®
Software superior by design.

New CA-dBFast Release 2.0.

© Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies.

Circle 26 on reader service card

Finally, A Notebook That Aren't

"A Winner...The Ultimate Subnotebook."

COMPUDYNE 486SL/33 SUBNOTEBOOK

$1,999

$74/MONTH*

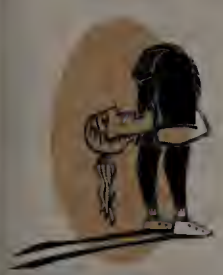
- Intel 486™ SL/33 CPU
- 4 MB RAM
- External 1.44 MB 3.5" Floppy Drive
- 80 MB Removable Hard Drive
- 640 x 480 VGA Backlit LCD Screen
- MS-DOS 6/Windows 3.1

For Power Users Power Lifters.

PC/Computing, July 1993.

COMPUDYNE SUBNOTE: A POWER-PACKIN' PROCESSOR IN A PENCIL-PUSHIN' PACKAGE

For those who would rather develop third quarter projections than triceps, Compudyne offers the most powerful processor available in a subnotebook—the Intel486™ at 33 MHz—in a tiny 3.9 pound package. Subnote adds an on-board math co-processor, 4MB of RAM, 8K of cache memory, an 80 MB removable hard drive, and Microsoft® DOS 6 and Windows™ 3.1, so it's big on the inside, but small on the outside.



FLEXIBILITY

Subnote has an internal expansion compartment, a PCMCIA II slot, and more ports than most wine shops: parallel, RJ11, serial, external floppy, AC adapter, PS/2™ mouse/keyboard, and VGA. Its 3.5", 1.44 MB external floppy drive comes standard.

FULL-SIZED FEATURES

Subnote's full-size, full-travel 79-key keyboard has inverted-T cursor control, editing and function keys, a numeric keypad, and a built-in trackball with side panel buttons. You don't get cramps lifting it; you don't get cramps using it.

A SHAMELESS DISPLAY

Not straining your back doesn't mean you have to strain your eyes. Subnote has a built-in 640 x 480 VGA backlit LCD screen with an 18 to 1 contrast ratio, plus a handy LCD indicator panel for system status.

TRAVEL LIGHT, TRAVEL LONG

SL 3.3 volt power management gives you up to four hours of use on the advanced Nickel Metal Hydride battery, plus more with the optional AA alkaline pack adapter. Optional fast charger and 12 volt auto adapter also make your work less draining.

OPTIONAL EQUIPMENT

- 2400 bps data modem with 9600 bps send/receive FAX
- Spare rechargeable NiMH battery for 4 extra hours of battery life
- Extra 80 MB hard disk drive
- 4 MB or 16 MB RAM upgrade
- Spare compact AC adapter/charger
- Spare external 1.44 MB 3.5" floppy drive
- 12V auto adapter
- Fast charger
- Numeric keypad
- AA battery adapter

Circle 14 on reader service card

COMPUDYNE FROM COMPUSA: $2 BILLION STRONG AND GROWING

The muscle behind Compudyne is none other than CompUSA®, the Computer Superstore℠, a publicly traded, $2 billion company with over 50 locations across the United States.

For the direct customer, this means that the full inventory of an entire superstore—over 5,000 products—is only one number away (that handy one below).

Compudyne and CompUSA team up to give you personal service, quick delivery, and the widest selection of name-brand items in the business, all at super low prices, every day.

GET A $75 REBATE DIRECT FROM HEWLETT PACKARD

...when you buy the HP Deskjet portable printer (#764952) and one of these accessories:

- cut sheet feeder
- rechargeable battery
- rapid recharger
- carrying case

HEWLETT PACKARD

THE HP DESKJET PORTABLE PRINTER
Only
$274.99
with rebate

COMPUDYNE
1-800-862-3095
COMPUSA
THE COMPUTER SUPERSTORE

You Shouldn't Have A Leg To Get All The

Bundled Systems That Will

486 POWER AND SX AFFORDABILITY: OUR 486SX/33 SYSTEM

- Intel486™ SX/33 CPU
- 4 MB RAM
- 1.44 MB 3 1/2" Floppy Drive
- Super I/O Board
- 512K Video Card
- 170 MB Hard Drive
- MS-DOS 6/Windows 3.1
- Keyboard and Mouse

We feature Intel inside every computer shown.

50 MHz PERFORMANCE AT A GREAT PRICE: THE 486DX2/50

- Intel486™ DX2/50 CPU
- 4 MB RAM
- 1.2 MB 5 1/4" Floppy Drive
- 1.44 MB 3 1/2" Floppy Drive
- 250 MB Hard Drive
- Super VGA Video Card
- Compudyne I/O VESA Local Bus Motherboard
- MS-DOS 6/Windows 3.1
- Keyboard and Mouse

PENTIUM™ OVERDRIVE READY

AFFORDABLE MULTI-MEDIA TECHNOLOGY: THE MULTIMEDIA MACHINE

- Intel486™ SX/33 CPU
- 4 MB RAM
- 1.44 MB 3 1/2" Floppy Drive
- 245 MB Hard Drive
- Dynamic Microphone
- PCTV Card with Capture
- Multimedia Card
- CD-ROM Drive
- 2400 bps Modem with 96/96 Send/Receive FAX
- 1 MB Local Bus Video
- Compudyne I/O VESA Local Bus Motherboard
- MS-DOS 6/Windows 3.1
- Keyboard and Mouse

CD-ROM

PENTIUM™ OVERDRIVE READY

IT'S LOADED! COMPUDYNE'S 66MHz INCREDIBLE OFFICE MACHINE

- Intel486™ DX2/66 CPU
- 4 MB RAM
- 1.44 MB 3 1/2" Floppy Drive
- 345 MB Hard Drive
- 250 MB Tape Backup System
- Super Local Bus Video Card
- CD-ROM Drive
- 2400 bps Modem with 96/96 Send/Receive FAX
- Compudyne I/O VESA Local Bus Motherboard
- Compudyne 15" .28 NI Monitor
- MS-DOS 6/Windows 3.1
- Keyboard and Mouse

CD-ROM

PENTIUM™ OVERDRIVE READY

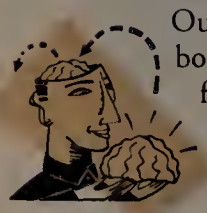
$999 (MONITOR OPTIONAL)

$1,399 $52/MO* (MONITOR OPTIONAL)

$1,999 $74/MO* (MONITOR OPTIONAL)

$2,999 $111/MO*

UPGRADABILITY



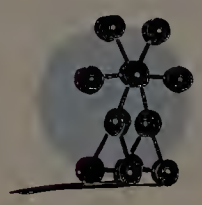
Our VESA Local Bus board and low-insertion force socket let you upgrade all the way to Intel's Pentium™ Overdrive™ processor.

RELIABILITY

Our desktop systems are assembled and tested at your local CompUSA by a team of technicians dedicated exclusively to local customer support.

CONFIGURABILITY

If one of these bundled solutions doesn't fit the bill, custom configure one from our stock of over 5,000 products.



RETURNABILITY

All systems come with a 30-day, no questions asked return policy.** It makes buying a computer care free.

SUPPORT *Toll-free technical support. On-site service for desktops†. Training classes available.*

WARRANTIES *30-day, no questions asked, return policy.** 1 year limited warranty. Extended warranty available.*

HOURS *7am-10pm (CDT) Mon.-Fri.; 9am-5pm (CDT) Sat.*

GOVERNMENT/EDUCATIONAL SALES CALL:

800-862-3088

FAX: 214-888-5783 · COMPUSA GSA#: GS00K93AGS-6319

To Give An Arm And Bells And Whistles.

Cost You Anything But.

THE ULTIMATE 66MHz CAD WORKSTATION, AT THE SMALLEST PRICE AROUND.

- Intel486™ DX2/66 CPU
- 8 MB RAM (1 MB x 8)
- Dual (1.2 & 1.44 MB) 3 1/2" / 5 1/4" Floppy Drive
- 345 MB Hard Drive
- 250 MB Tape Backup System
- Super Local Bus Video Card
- Compudyne I/O VESA Local Bus Motherboard
- Compudyne 17" SVGA .28 NI Monitor
- MS-DOS 6/ Windows 3.1
- AutoDesk AutoSketch
- Keyboard and Mouse

PENTIUM™ OVERDRIVE™ READY

$3,499
$129/MO*

TOWER OF POWER: THE AFFORDABLE 66MHz SERVER SOLUTION

- Intel486™ DX2/66 CPU
- 16 MB RAM (4MB x 4)
- 1.44 MB 3 1/2" Floppy Drive
- 540 MB Hard Drive
- 250 MB Tape Backup System
- 800 x 600 Video Card
- Compudyne I/O VESA Local Bus Motherboard
- MS-DOS 6/Windows 3.1
- Keyboard and Mouse

PENTIUM™ OVERDRIVE™ READY

MICROSOFT® WINDOWS™ READY-TO-RUN

Every computer shown is Microsoft® Windows™ Ready-to-Run

$2,899
$107/MO* (MONITOR OPTIONAL)

COMPUDYNE SLIMNOTES WHOLE LOTTA MUSCLE, NOTTA LOTTA MOOLA.

Compudyne's Slimnotes offer the raw power of the Intel486™ DX2/66, the fastest processor available in a notebook. The only advantage you'll have to working in the office is a place to set your coffee.

$2,999
$111/MO*

Our monochrome Slimnote is slightly thinner (at 1.6") and weighs in at only 5.8 pounds with its 10" VGA 640 x 480 brilliant LCD screen.

$4,499
$166/MO*

The 6.2 pound, 8.5" x 11" x 2.2" color Slimnote puts that incredible power behind an 8 1/2" TFT active matrix 256-color screen.

- 210 MB hard drive
- Internal 3.5", 1.44 MB floppy drive
- Full-size 84 key keyboard with 10 function keys, including dedicated 'Page up/down', 'Home', and 'End' keys
- Integrated trackball
- 2.5 hour battery life with rechargeable NiMH battery
- Expansion chassis, PS/2 mouse/keyboard, parallel, serial, and external video connectors
- Preloaded with Microsoft DOS 6 and Windows 3.1

SERVICEABILITY

We offer knowledgeable salespeople, on-site and in-store technical support, training classes, and toll-free phone support.

ACCESSIBILITY

- *Atlanta • Baltimore • Boston • Chicago*
- *Cincinnati • Dallas • Denver • Detroit*
- *Greensboro • Houston • Kansas City*
- *Las Vegas • Los Angeles • Miami • Milwaukee*
- *New Orleans • New York City • Norfolk*
- *Philadelphia • Phoenix • Pittsburgh*
- *Providence • Rochester • Sacramento*
- *San Diego • San Francisco • St. Louis*
- *Tampa • Washington, D.C.*

*Leasing arranged through Leasing Group, Inc., payments based on 36-month open-end rate. **Must be returned "as new" in original packaging. †Within the continental United States. Each system will be shipped from the nearest CompUSA Superstore℠. CompUSA is not responsible for typographic/technical errors. Other limitations apply. Training courses not offered as vocational training or as qualifying one for any particular employment. Course credits not transferable to any accredited educational institution. In Texas, Nevada and Connecticut, classes are offered as employer sponsored courses, not open to general public. Prices and specifications subject to change without notice. Intel 486 and the Intel Inside logo are trademarks of the Intel Corp. ™/® Trademarks belong to their registered owners. On-site service for notebooks optional. CompUSA Direct, 15167 Business Avenue, Dallas, TX 75244.

COMPUDYNE

1-800-862-3095

COMPUSA

THE COMPUTER SUPERSTORE℠

CANADA: 214-702-0055
24 HR FAX: 214-888-5743
INTERNATIONAL ORDERS WELCOME
ON OUR 24 HR FAX LINE: 214-888-5706

PCW0931

Circle 14 on reader service card

HARDWARE Q & A

Conflict Resolution

Q I tried installing a Microsoft bus mouse (which uses its own interface board) in my Dell Dimension system, but it didn't work. It worked perfectly in someone else's ISA machine. Why doesn't it work in mine?
Kurt Lofgren, Raleigh Hills, Virginia

A I assume you've carefully followed the steps in the mouse's software setup routine, or you've specified that you have a Microsoft-compatible mouse in the setup routine of some other application or environment. Also, make sure you've inserted the mouse's interface board all the way into the slot.

Still not working? Most of the time it's because the bus mouse's interface and some other board in the system are trying to use the same interrupt request (IRQ) line. Nearly every expansion board needs its own IRQ line to function properly. The usual way to find out which board has been assigned which IRQ is to check the switch settings, jumper positions, and documentation for every board in your system.

But there's an easier way. Before you plug in the mouse interface again, try entering **MSD** at the DOS prompt. If you have either Windows 3.1 or DOS 5.0 or 6.0 (and your DOS and Windows directories are in your PATH statement, as they should be), a handy little utility called Microsoft Diagnostics will load. Type **Q** at the opening menu. A list will appear describing the most common use for each IRQ, along with the current status of all 15 IRQ lines. If you see a 'No' or a blank in the Status Detected column, that IRQ line is available for use by any expansion board. Note the numbers of all available IRQs.

Now have a good look at the mouse interface card. Near the connector that plugs into the slot, you'll find the J4 *jumper block*—several pairs of pins with a tiny plastic-encased jumper covering one pair. The jumper determines which interrupt the interface card uses. Unlike most interrupt jumper blocks, J4 actually has an IRQ number printed next to each pair of pins; if the jumper sits on the pair labeled "2", for example, then the board is all set to grab IRQ2.

You can figure it out from there. Microsoft's bus mouse interface gives you a choice of IRQs numbered 2 through 5. If Microsoft Diagnostics indicates that, say, IRQ5 is available, move the jumper to the 5 position, plug in the board, and you're in business. Incidentally, if you don't have Microsoft Diagnostics, a number of other diagnostic utilities show you interrupt assignments and more (my favorite is CheckIt Pro from TouchStone Software; 800/531-0450, 714/969-7746 in California).

So what happens if you're sure there's no interrupt problem and the thing still won't work? Then it's time to troubleshoot the second–most common conflict, in which two boards try to use the same I/O address—that is, they both pass their data through the same place in memory. I/O address conflicts occur most frequently between similar devices, such as two video boards or two hard disk controllers. Some boards let you change the I/O address using switches or jumpers, but many don't. If two boards have the same fixed I/O address, you can't install them in the same machine.

Bus mouse I/O address conflicts occur only when another bus mouse interface is present—say, built into a video card or a multifunction board. The only reason to install a second mouse interface is if the first interface is incompatible with your Microsoft mouse. If so, you can change the I/O address to a secondary location by moving the jumper on jumper block J3.

Microsoft's mouse interface is about as simple as expansion boards get, so the risk of conflict looms larger as the number and complexity of boards increase. Remember to keep the documentation on every board in your system, particularly since few are as straightforward—or as clearly labeled—as the Microsoft Mouse interface board.

So That's Why They Call It SCSI

Q I've read in *PC World* about systems with SCSI interfaces that "allow you to chain up to seven SCSI devices." Have you really tried this? I had enough trouble getting one to work, and two seems to be out of the question.
Ralph Poledgey, Hutchinson, Minnesota

A SCSI (standing for Small Computer Systems Interface and pronounced "scuzzy") is one of those standards that's great in theory but sometimes hellish in practice. The *idea* is that you can plug up to seven SCSI devices—hard drives, CD ROM drives, WORM drives, SCSI scanners, whatever—into a SCSI interface board; "chaining" means hooking a device to the back of an already installed device. You can do this, but getting there is seldom fun.

SCSI is one of those standards that's great in theory but sometimes hellish in practice.

Each SCSI device manufacturer seems to do things a little differently. In fact, unless you install special software, certain SCSI devices only work with an interface board from their own manufacturer. Some standard!

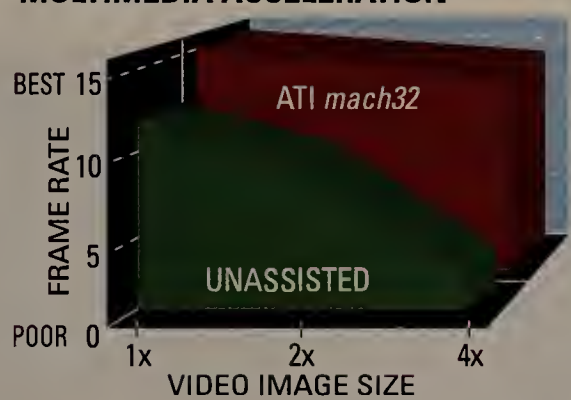
Here are a few useful pointers that can help you run multiple devices off the same interface. The first thing you need to know is that you should *not* tell your system that you're installing a new peripheral, even if you plan to add a SCSI hard disk. In other words, there's no need to run your PC's configuration routine and change anything (in contrast to the procedure for installing IDE drives described in June's column).

Now for the SCSI nitty-gritty. The SCSI interface and all SCSI devices that you install must be assigned a unique ID number from 0 to 7. By default, SCSI interface boards come configured as number 7. SCSI devices,

Don't Jump to a Graphic Conclusion

If you're about to take the plunge on a new graphics accelerator, get one that won't limit your future. ATI's GRAPHICS ULTRA+ and GRAPHICS ULTRA PRO give you no-regrets performance with all of today's applications. And they're perfectly poised for the leap forward into 32-bit operating systems and multimedia applications.

MULTIMEDIA ACCELERATION



GRAPHICS ULTRA+

- ▶ True color at 800x600 and 65,000 colors at 1024x768
- ▶ Non-interlaced 1280x1024 in 256 colors
- ▶ Flicker-free Windows, up to 76Hz refresh rate
- ▶ 2.0MB memory
- ▶ Fast DOS and graphics performance
- ▶ Enhances and accelerates Video for Windows
- ▶ **$299.00**[3]

GRAPHICS ULTRA PRO adds

- ▶ VRAM for better performance at higher refresh and greater colors
- ▶ Non-interlaced 1280x1024 graphics at 74Hz refresh
- ▶ ISA, EISA and Micro Channel versions available[4]
- ▶ **$499.00**[3]

Get the Jump on the Latest Technology

Don't let inadequate technology give you or your PC a nervous breakdown. Our *mach32* Accelerator Chip and 2.0MB of standard memory accelerate graphics to heights that others can't match. And ATI's newest accelerators are multimedia-ready, with hardware-assisted scaling of motion video images under Windows for full screen playback.

accelerated by mach32 ATI TECHNOLOGIES INC.

indeo™ INTEL VIDEO TECHNOLOGY

Software Safety Net

Software driver support shouldn't have to be a giant leap of faith... but without it, an accelerator is just an expensive VGA card. ATI gives you the best driver selection with the full security of 8514/A-compatible acceleration, plus up-to-the-minute ATI drivers for all major applications, including 32-bit environments, like OS/2 2.1 and Windows NT.[1]

Don't Fall Behind

ATI helps you stay on the leading edge, without going over the brink financially. Our new upgrade plan[2] lets you move up to the latest hardware... at a fraction of the regular price.

So look before you leap. Drop in to your local ATI dealer and let our counselors help you avoid a graphic mistake.

GRAPHICS ACCELERATORS • MULTIMEDIA • COMMUNICATIONS

MICROSOFT WINDOWS COMPATIBLE · PC MAGAZINE EDITORS' CHOICE · PC MAGAZINE EDITORS' CHOICE · PC Computing MVP 92 WINNER · press 2

ATI TECHNOLOGIES INC. Perfecting the PC

ATI TECHNOLOGIES INC.
33 Commerce Valley Dr. E.
Thornhill, Ontario
Canada L3T 7N6
Tel: (416) 882-2600
Fax: (416) 882-2620

Copyright © ATI Technologies Inc., 1993. ATI, GRAPHICS ULTRA+, GRAPHICS ULTRA PRO and *mach32* are registered trademarks of ATI Technologies Inc. All other company and/or product names are trademarks and/or registered trademarks of their respective manufacturers. Features and specifications are subject to change without notice. Products may not be exactly as shown. [1]32-bit OS/2 2.1 drivers will be available in August 1993; 16-bit OS/2 2.1 drivers currently included. ATI drivers included in Windows NT package. [2]Tradeup plan to latest ATI products; call or fax for further information. [3]Suggested US retail prices, dealers may sell for less. [4]Mouse included with ISA versions only.

Circle 5 on reader service card

on the other hand, usually come configured as 0 or 1—assignments you can change using jumpers or switches to ensure every SCSI device has a unique ID.

Say your needs are modest and you simply want to hang two SCSI hard disks off the same interface. SCSI interfaces usually let you boot only from drive 0, so begin by setting the drive you want to boot from to 0 and the second one to 1. Next, since a SCSI interface is an expansion board like any other, go through the procedure outlined in the previous question to avoid IRQ and I/O address conflicts.

Seat the board in an open slot and plug the SCSI ribbon cable into it (a cable with two drive connectors usually comes with the interface). If the SCSI interface includes a floppy controller on board and a floppy controller is already active in your system, disable the one on the interface.

Now make sure the last drive in the SCSI chain has its *terminating resistors* installed. These generally look like three tiny combs lined up next to the ribbon cable connector, but check the drive's documentation to be sure. Then remove the terminating resistors from the other drive. Physically mount the drives in your system and hook them to the ribbon and power cables.

Run any diagnostic routines included with the interface and verify that everything's configured correctly. Next, partition each drive using DOS's FDISK, which enables you to create either several logical drives or one big one for each physical drive. Then format the drives with DOS.

The above scenario assumes that the SCSI drives will be the only two hard disks in your system. If you plan to install more than two, or if you want to chain other types of devices from various manufacturers, you're best advised to load an Advanced SCSI Programming Interface (ASPI) driver, a small piece of software that comes with your interface and enables all manner of SCSI interfaces and devices to talk to each other. If you go the ASPI route, I suggest you also run out and buy a handy a utility called CorelSCSI ($99 suggested retail, available at most software chains). The program can make mixing and matching exotic SCSI devices easier than the hard disk installation procedure we've described.

You still need to give each device a unique ID number, avoid the usual board conflicts, disable any redundant floppy controllers, and remove all but the last device's terminating resistor. To load the ASPI driver, copy it to the root directory of your boot disk and create the following first line for your CONFIG.SYS: **DEVICE=***ASPI driver file name*. Now pop the CorelSCSI disk into drive A:, type **INSTALL**, and follow the instructions. Choose *Express Configuration*, and CorelSCSI will assign drive letters to all the devices on the chain. I tried this with an Always IN-2000 interface and a bunch of different devices and it worked like a charm. If there's a hard disk in the chain, don't try to use DOS's FDISK to partition it—use Corel's Cformat, which partitions it *and* DOS formats it in one swoop.

By Eric Knorr

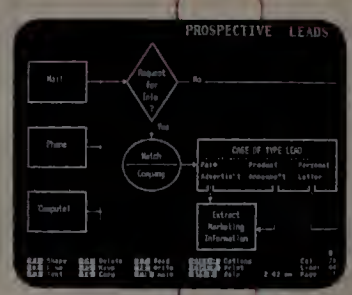
Eric Knorr is a contributing editor for PC World. Hardware *welcomes your questions. See page 12 for contact information.*

ARE YOU SPENDING TOO MUCH TIME DRAWING FLOWCHARTS?

YOU NEED FLOW CHARTING™ 3.

Every day, professionals worldwide save time and money using Flow Charting 3. It's fast, efficient, easy to use, and always produces presentation-perfect charts and diagrams.

With Flow Charting 3's built-in flexibility, you can create customized charts using a variety of shapes, lines, and text—placed where you want them.



Plus, Flow Charting 3 is now available in a LAN version. Making it easy to share files and set up work groups for specific projects.

And it's backed with free technical support and a 90-day no-risk guarantee. So if you're spending too much time drawing charts, call for a free demo and see for yourself what makes Flow Charting 3 the best-selling flowcharting software.

See your dealer today! Or for a free interactive demo disk,call 1-800-525-0082, ext. 252
International: 408-778-6557, ext. 252

PATTON & PATTON
Software Corporation

Novell is a registered trademark of Novell, Inc.

Excellence in charting the flow of ideas!

Patton & Patton Software Corp. 485 Cochrane Circle, Morgan Hill, CA 95037

Circle 233 on reader service card

Get Software and Online Time...Free!

❑ Yes! I want to try PC WORLD ONLINE on America Online. Send me my FREE America Online software and give me FREE America Online time. I understand there is no obligation.

Name _____

Address (No P.O. Boxes) _____

City _____ State _____ Zip _____

Home Phone Number ( ) _____

Disk Type and Size: ❑ PC 5.25 ❑ PC 3.5 ❑ Macintosh
❑ High Density ❑ Low Density

Do you use Windows 3.1?* ❑ Yes ❑ No

*Note: America Online for Windows requires a 386 PC, 4MB of RAM, a VGA monitor, and Windows 3.1. America Online is a registered service mark of America Online, Inc. PC WORLD and PC WORLD ONLINE are registered trademarks of PC WORLD Communications, Inc. Windows is a registered trademark of Microsoft Corporation.

7564/W

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 9096 VIENNA, VA

POSTAGE WILL BE PAID BY ADDRESSEE

AMERICA®
Online

8619 Westwood Center Drive
Vienna, VA 22182-9806

SEPTEMBER DRAWING SEPTEMBER DRAWING SEPTEMBER

Subscribe today and you could **WIN** this high-speed modem.

Practical Peripherals PM14400FX PKT **Pocket Modem.**

A miniature V.32bis powerhouse with 14400 data, 14400 fax, free Windows/DOS fax/data software and lifetime warranty.

LOOK WHO'S HANGING OUT ON LINE

PC WORLD ONLINE

1,000 OF INFO

MADE IN AMERICA ONLINE®

A searchable database of PC WORLD Magazine's current and back issues •

PC WORLD Magazine's editors and experts in weekly ONLINE CHATS •

More than 300 megabytes of the very latest SHAREWARE •

Exclusive NEWS and reviews •

All this and America Online® too •

Dial 1 800 827 6364 ext. 7564 and receive ten FREE hours of PC WORLD Online when you subscribe.

Circle 207 on reader service card

Isn't it About Time Your Documents got an Attitude?

Agnes ASPEN BAMBAM benediction
Cambria CARTOON Casual Carrina
Chancellor CHILL CHOICE Country Club
Dance DALMATION DECORAGE
DELHI Doily DEGRADE DUNCAN Digo
EMPIRE FIRE FLAMINGO Flores
Frankenfooter Gaslight HORROR
Invitation Knarly Lakeside Lizard
LOOPY MOO-GOO MORBIUS Moulin Rouge
MOZAMBIQUE Nervous Nottingham Ornate
PENCILPOINT PICANTE RAHRAH RANSOM
Renaissance Rhino Ripper Roady Rooster
Ruhr SAHARA SALOON SCRAWL SEASCAPE
Sesar SLAMMIC SLAVIC SPANKY STARCAST
STKK UGANDA UNDERGROUND Uppercrust
Waterfall Whitewash Willroge ZAP Zephyr

(This is only a partial listing of the fonts in the package.)

The MasterPiece TrueType Font Library includes over 150 fonts in different families in popular text and one-of-a-kind display faces. The MasterPiece TrueType Font Library is a unique collection of fonts for the beginner as well as the advanced desktop publisher and word processor user. The Library installs automatically and

Special Offer

ONLY $49.95

VISA, MC, AMEX, Discover, Check, MO, COD, PO's (OAC).

CALL
800-568-4607

Attitude, Inc.
14742 Beach Blvd.
Suite 440
La Mirada, CA. 90638
(714) 680-8112
FAX (714) 680-6640

Circle 36 on reader service card

YOU'LL GET 50 IMAGES AND 50 AUDIO CLIPS

100 COOL CLIPS ...FREE

Get a free CD-ROM with 80 MB of clip art when you subscribe to

PC WORLD Multimedia Edition

The "Best of MediaClips"™ CD-ROM sampler disk
This "Best of Media Clips"™ features the best images and sounds from **Aris Entertainment's** ™ royalty free media clips. These stunning image and audio samples of clip art will make creating powerful presentations a breeze.

Each issue comes with Multimedia World:
- 92+ pages of multimedia PC information
- Reviews and Buyers' Guides for the latest multimedia products and CD-ROM titles
- Articles on Edutainment, Entertainment, Creative Tools, Multimedia Presentations and much more ...

If you're a current subscriber to PC WORLD and would like to extend your subscription to receive the Multimedia Edition each month at 12 issues for $24.95, call our 800 number now! As a BONUS you'll start receiving the Multimedia Edition immediately for the remainder of your current subscription. Call now!

Order now 1-800-825-7595 ext. 501 [39AF]

PC World Multimedia Edition, 501 Second Street, Ste. 600, San Francisco, CA 94107
Fax (415) 882-0936. Only $24.95 for 12 issues

Free Money.

Due To Overwhelming Demand, This Incredible Offer Has Been Extended.

Over One Million Americans Have Already Responded!
Call Right Now To Get New Kiplinger's™ CA-Simply Money™ For FREE!
Operators Are Standing By – Call 1-800 FREE MONEY Today!

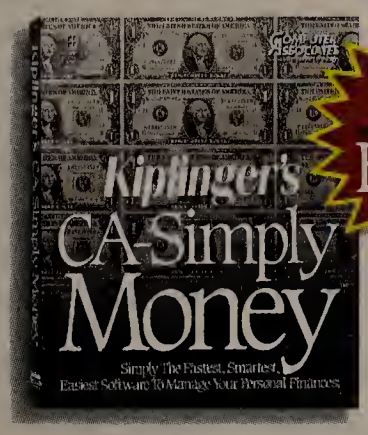
Introducing The Easiest, Quickest And Smartest Personal Finance Software In The World.

Is your spending out of control? With Kiplinger's CA-Simply Money, you can get off the financial rollercoaster and on the path to financial freedom. Write checks with a click of the mouse. Balance your checkbook. Create a monthly budget and control your expenses. What used to take hours now takes just minutes.

MICROSOFT WINDOWS COMPATIBLE

It's that quick and easy. And it's just plain smart. Kiplinger's CA-Simply Money puts you in total control of all your finances so you can make smarter decisions.

"Kiplinger's CA-Simply Money makes everything simple and easy. For the very first time, I'm in total control of all of my finances."



~~$69.99~~ FREE!

A Personal Financial Advisor Filled With Expert Advice From Kiplinger.

For more than 70 years, Kiplinger has been the first name in personal finance. Now their expert financial and tax advice will be right at your fingertips.

To prove how simple and easy Kiplinger's CA-Simply Money is, we're giving away millions of copies for FREE.

That's right. You can get this $69.99 product FREE.

But you have to act fast. Pick up the phone right now and order your FREE copy of Kiplinger's CA-Simply Money today.

New Kiplinger's CA-Simply Money Covers Simply Everything:

- Kiplinger's Financial Advisor
- Checking and Savings
- Investment Tracking
- Tax Reports
- Automatic Budgeting
- Computerized Check Writing
- Credit Cards
- IRAs/401(k)s
- Modem Stock Update
- Mortgages
- Financial Calculators
- Memorized Transactions

For A FREE Copy Of Kiplinger's CA-Simply Money Call: **1-800-FREE-MONEY Dept. J-3701.**

COMPUTER ASSOCIATES®
Software superior by design.

Kiplinger's CA-Simply Money

*There is a nonrefundable $6.95 shipping and handling charge. Have your credit card ready: Visa, Mastercard, AmEx, Discover accepted. One copy per household. Only available in the US. IBM PC or PC compatible with Windows 3.1 and minimum 2Mb RAM required. This offer is subject to availability. Computer Associates reserves the right to end the offer at any time. © Computer Associates International, Inc., Islandia, NY 11788-7000. Kiplinger's is a trademark of The Kiplinger Washington Editors, Inc. All product names referenced herein are trademarks of their respective companies.

Circle 51 on reader service card

STAR-DOT-STAR TIPS

Weekly Cleaner

After experiencing problems with a DAT tape backup unit, I decided to make sure I cleaned its heads at least once a week. To jog my memory, I wanted my computer to display a reminder when I booted it on Monday mornings. I therefore wrote WEEKDAY.COM [see **FIGURE 1**], which makes a batch file execute certain commands—including weekly reminders—on particular days of the week. WEEKDAY.COM returns a DOS ERRORLEVEL corresponding to the current day of the week based on the system clock (where 0=Sunday, 1=Monday, and so on until 6=Saturday).

```
A 100
MOV AX,2A00
INT 21
MOV AH,4C
INT 21
RET

N WEEKDAY.COM
RCX
A
W
Q
```

FIGURE 1: BATCH FILES DETERMINE THE DAY OF THE WEEK with WEEKDAY.COM, created from this DEBUG script.

The batch file WHATDAY.BAT [**FIGURE 2**] demonstrates how this works. As written, it performs certain commands on Monday, certain ones on Friday, and others every day. When you modify this batch file, remember that the IF ERRORLEVEL statement returns 'true' if the error level is *greater than or equal to* a specific number. Therefore, your IF ERRORLEVEL commands should work from high numbers down to lower ones *[you can also work from low to high if you use IF NOT ERRORLEVEL —Ed.]*. If you reboot more than once a day, you may want to use WHATDAY.BAT in conjunction with one of the "once-a-day" batch files that have appeared in this column [such as "A Better One-a-Day Solution," April 1992] to display the message only the first time the PC is booted.

Bob Whiteman, Northvale, New Jersey

Editor's note: If you're on PC World Online, you can download WEEKDAY.COM and WHATDAY.BAT directly from the Featured in September folder. But if you're not, copy the listing in Figure 1 to an ASCII text file called **WEEKDAY.SCR**, then type **DEBUG < WEEKDAY.SCR** at the DOS prompt. WEEKDAY.COM will appear in the current directory.

```
@ECHO OFF
WEEKDAY
IF ERRORLEVEL = 6 GOTO EVERYDAY
IF ERRORLEVEL = 5 GOTO FRI
IF ERRORLEVEL = 2 GOTO EVERYDAY
IF ERRORLEVEL = 1 GOTO MON
IF ERRORLEVEL = 0 GOTO EVERYDAY
GOTO ERROR
:MON
REM  INSERT COMMANDS FOR MONDAY HERE
ECHO REMEMBER TO CLEAN THE DAT DRIVE
GOTO EVERYDAY
:FRI
REM  INSERT COMMANDS FOR FRIDAY HERE
ECHO TGIF!
GOTO EVERYDAY
:EVERYDAY
REM  INSERT COMMANDS FOR EVERY DAY HERE
ECHO GOOD MORNING!
GOTO END
:ERROR
ECHO ERROR READING DAY OF WEEK!
:END
```

FIGURE 2: THIS BATCH FILE, WHATDAY.BAT, shows how WEEKDAY.COM executes commands based on the day of the week.

Copy Codes

If a batch file must, in the course of its duties, copy files to a floppy disk, you'll want it to detect when the floppy is full. Fortunately, DOS's XCOPY command gives you a way to do that. When XCOPY fails due to an error condition, it sets an exit code that describes the nature of the problem. Exit code 4 is returned when the disk is full or if the system runs out of memory (the latter being a rare event). By checking this condition with an IF ERRORLEVEL command, you can make your batch file behave appropriately.

Bob McDearmid, Lithonia, Georgia

Editor's note: This trick is a useful way of determining if you've overflowed a disk. **FIGURE 3** shows all the exit codes that XCOPY returns as well as what conditions produce each code.

When you write your batch files, remember that IF ERRORLEVEL is satisfied if the exit code is *greater than or equal to* the number specified after ERRORLEVEL. Thus, the command

USER GROUP TIP

Freeing Up Space With DOS 6.0

The DOS 6.0 Installation program automatically copies about 400K of DoubleSpace files into your DOS directory, even if you don't plan to use this disk compression system. To reclaim that valuable hard disk real estate but keep DoubleSpace handy if you decide to install it later, use the DOS 6.0 MOVE command to transfer C:\DOS\DBL*.* to a floppy.

If you choose not to remove these files, you'll also waste space on bootable floppies. That's because when you format a floppy using the /S switch (to make it bootable), DOS 6.0 puts DBLSPACE.BIN—a 51K hidden, system, and read-only file—on it. To free up that 51K, first log on to the floppy drive (A: or B:), change DBLSPACE.BIN's attributes by typing ATTRIB -H -S -R DBLSPACE.BIN, then delete the file with DEL DBLSPACE.BIN.

Rich Schinnell
Capital PC User Group

THINGS THAT SCREAM.

A baby in the middle of the night.

Our new 486 color notebook.

From 0 to 66 MHz in no time flat.

Introducing Austin Computer's new 486 color and B&W notebook family. Featuring 32-bit local bus video, serious Windows users will appreciate the speed — screaming along at 66 MHz. And PCMCIA type II & III slots.

The largest hard drive available anywhere.

This lightning-fast machine is sure to keep you busy, so you'll want plenty of storage capacity. That's why we've equipped our notebooks with your choice of hard drive options from 130 MB to 340 MB — the largest on the market.

Choose your own processor.

There's a color or B&W notebook model that's right for you. Many configurations — Intel® SX-25, DX-33 and DX2-66 CPUs. All with lots of features and plenty of power. Windows 3.1 and DOS 6.0 come preinstalled on all our notebooks.

Color models start at $2,999.

A hot price for active TFT color. And our B&W models start at $1,799. That's hundreds less than our competitors, which is sure to leave them crying. Call and ask for your Austin Computer 486 notebook. Miss out on this and you'll want to scream.

INTRODUCTORY SALE PRICES

Austin Notebooks	$1,799	$2,999	$2,999	$4,499
• Intel 486 CPUs 25-66 MHz	• 486SX-25 Mono	• 486DX2-66 Mono	• 486SX-25 Color	• 486DX2-66 Color
• 8.5" x 11" x 1.75"	• 4 MB RAM standard	• 8 MB RAM standard	• 4 MB RAM standard	• 8 MB RAM standard
• 6.38 lbs (including battery)	• 130 MB Hard Drive	• 340 MB Hard Drive	• 130 MB Hard Drive	• 340 MB Hard Drive

800-331-1501

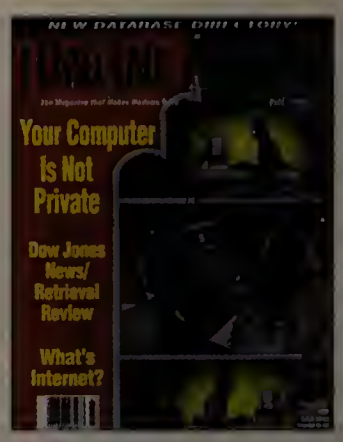
Canada - 800-338-1565. Overseas 512-339-3500. Fax 512-454-1357.

10300 Metric Boulevard • Austin, Texas 78758

© 1993 Austin Computer Systems. All rights reserved. Other product names or trademarks shown herein are for illustrative purposes only and may be the property of other companies. Prices and specifications are subject to change without notice. Austin Computer Systems cannot be responsible for errors in typography or photography. Intel and the Intel Inside trademark logo are trademarks of Intel Corp. Microsoft is a registered trademark and Windows and the Windows logo are trademarks of Microsof Corp.

Circle 32 on reader service card

Free



FIRST ISSUE

Whether you're a pro or a beginner in using online services, **Online Access Magazine** will give you and your PC the competitive edge. **Online Access** is the only national consumer magazine for business users of online services and products.

We cover a fascinating online world, from investment services to bulletin board systems to the developing world of CD-ROM databases.

NO RISK!

☐ I'll take my free copy of Online Access. If I'm not completely happy with my trial subscription, I can simply write "cancel" on the bill; the first issue is mine to keep, absolutely free.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip Code _____

☐ Payment Enclosed ☐ Bill Me

Fax this page to 312-573-0520 or clip and mail to:
Online Access, Subscription Department,
920 N.Franklin, Suite 203, Chicago, Il, 60610.
PCW

One year subscription, 9 issues (8 issues + 1 free), $19.80. Canadian price same as US; all other countries $49.80 (US funds only, please.) Subscription may be cancelled at any time for refund of any unmailed copies.

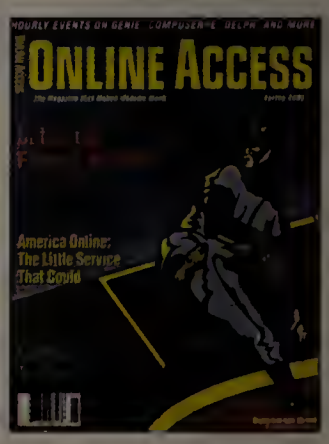
Learn how to work more efficiently by going online; access the information you need to remain competitive in a rapidly changing marketplace. **Online Access** is your unequalled source in keeping track of over 5,000 commercially available databases and new services online.

Ask for your free copy today: ***reading Online Access may just be one of the best investments you'll ever make.***

Or Call Today For Your Free Issue!

1-800-36-MODEM

(1-800-366-6336)
(Please ask for new subscriptions dept.)



ONLINE ACCESS

Save the Workout for the Gym

Traditional keyboarding can be a real workout. Twisting your wrists, arching your fingers, stretching your hands: All the usual gymnastics. A risky business indeed. But with the Kinesis™ Ergonomic Keyboard, keying's no sweat. A Kinesis keyboard works with you, however you choose to work:

In familiar Qwerty, Dvorak or a key layout of your own design. With energy-saving macros. Palm rests. Optional foot switches. For performance minus the physical challenge, call 800.454.6374. Use a Kinesis keyboard for a month. If it doesn't work out, we'll refund your money.

KINESIS™ CORPORATION

915 118th Avenue Southeast | Bellevue, Washington 98005-3855 | USA | 800.454.6374 | Fax 206.455.9233

Circle 118 on reader service card

Exit code	Error condition
0	No error
1	No files found to copy
2	XCOPY was interrupted by <Ctrl>-C
4	Disk full, invalid parameters, or insufficient memory
5	Disk write error

FIGURE 3: XCOPY RETURNS THESE EXIT CODES, which you can use to control your batch files.

```
YCOPY.BAT:
@FOR %%F in (%1) DO CALL CHKCOPY %%F %2

CHKCOPY.BAT:
@ECHO OFF
:START
XCOPY %1 %2
REM If no error, exit
IF NOT ERRORLEVEL 1 GOTO DONE
REM If other than disk full, warn user
IF ERRORLEVEL 2 GOTO GT1
ECHO Error: File %1 doesn't exist!
GOTO DONE
:GT1
REM If exit code is 2, Ctrl-C
IF ERRORLEVEL 4 GOTO GT2
ECHO Copy of %1 halted by Ctrl-C
GOTO DONE
:GT2
REM If exit code is 4, disk may be full
IF ERRORLEVEL 5 GOTO ERROR
ECHO Please change disk, then
PAUSE
:ERROR
ECHO Copy of %1 failed
:DONE
```

FIGURE 4: THESE TWO BATCH FILES, which work together, demonstrate how to use XCOPY's exit codes.

IF ERRORLEVEL 1 GOTO DONE will take the batch file to the :DONE label if XCOPY's exit code is 1 or anything above 1, while IF ERRORLEVEL 5 GOTO ERROR will send you to :ERROR only if XCOPY has returned an exit code of 5.

I wrote two sample batch files, both shown in **FIGURE 4**, to illustrate how this works. YCOPY.BAT and CHKCOPY.BAT work together to copy files from one source to another, pausing if you need to swap disks. You run them by launching YCOPY, passing the copy's source and destination to it as parameters. When you copy files using this batch combination, don't worry about the 'File Not Found' messages—your files are being found. The two batch files can be found in the Featured in September folder on PC World Online.

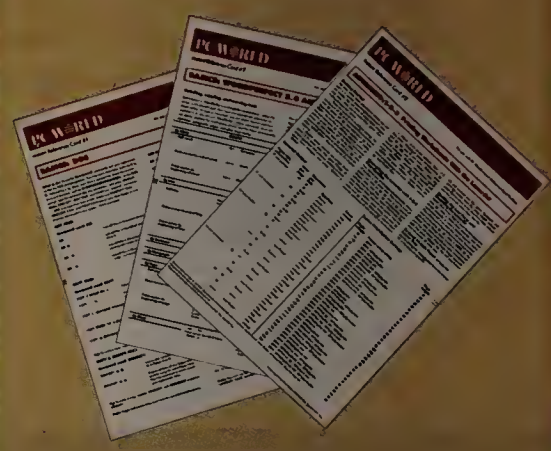
Counting Pages in WordPerfect, Concluded

In "Getting to the Bottom of WordPerfect" in the November 1992 *Dialog Box*, Neville G. Weekes described how to use a macro to put the number of pages in a footer or header. This macro has a problem, however: You must run it every time you make a change to the document that increases or decreases the total number of pages. If you forget to run the macro before printing your revised document, you'll get incorrect information in your header or footer.

A more foolproof way to put the last page number into a header or footer is with *WordPerfect*'s automatic cross-referencing feature. Press **<Home><Home><Down>** to get to the end of the document, then press **<Alt>-<F5>RT**, type **LAST PAGE**, and press **<Enter>**. This will insert a reference target called LAST PAGE at the end of your document.

Next, create your header or footer. For a right-aligned header that will appear on every page, go to the header screen by pressing **<Home><Home><Up>** and then **<Shift>-<F8>PHAP**. To right-align your text, press **<Alt>-<F6>**. Enter the header text, pressing **<Ctrl>-B** where you want the current page number to appear. Where you want the *last* page number to appear, press **<Alt>-<F5>RRP**. *WordPerfect* will prompt you for a target name and may give you 'LAST PAGE' as the default; if 'LAST PAGE' isn't the default, type it in. Press **<Enter>**, then **<F7><F7>** to exit the header screen.

PC WORLD GIVES YOU A WINNING HAND!



Tired of flipping through user manuals?

Can't *find* the user manual?

Need lightning-quick access to key commands and features?

Need a software reference you can take anywhere?

PC WORLD'S NEW INSTANT REFERENCE CARD IS YOUR BEST BET.

This monthly pullout card gives you a full house of tips on using essential applications. One side provides basic commands that get you started; side two raises the stakes, with advanced pointers to help experienced users squeeze every bit of productivity out of their software and hardware investment.

LOOK FOR THESE INSTANT REFERENCE CARDS:

WordPerfect
Microsoft Word
Windows 3.0
Procomm Plus
Ventura Publisher
Paradox
Excel
PageMaker
1-2-3
DOS
CompuServe
...and more!

PC WORLD

Instant Reference Card #40

For use with PC World Instant Reference Card Portfolio

1-2-3 RELEASE 4.0 FOR WINDOWS

1-2-3 release 4.0 for Windows consists of a *control panel* (title bar, menu bar, and edit line) and a *SmartIcons bar* at the top, and a *status bar* (information about the current selection, file, and 1-2-3 mode) at the bottom. A *Tab bar* tops each file window. A *file* is like a notepad of up to 256 worksheets. A *range* is a rectangular group of one or more cells, one or more sheets deep. You can right-click a selected range, chart, or drawing to open a *Quick menu* of pertinent commands.

Note: Keys to press are shown here in **boldface**. Keys to press simultaneously are joined by a hyphen. A bullet (•) links menu, option, button, check box and drop-down list box names in a series.

SMARTICONS

SmartIcons expedite common tasks. You can click the status bar button to select a different SmartIcons set. The SmartIcons set changes according to the object selected. Right-click a SmartIcon to see its description in the title bar.

Button	Task	Keyboard or mouse
	Open existing file	**<Ctrl>-O** or **File** • **Open**
	Save current file	**<Ctrl>-S** or **File** • **Save**
	Print worksheet(s) or selected range	**<Ctrl>-P** or **File** • **Print** • OK
	Preview printout of worksheet(s) or selected range	**File** • Print Preview • OK
	Undo last command or action	**<Alt>-<Backspace>** or **<Ctrl>-Z** or **Edit** • **Undo**
	Cut selected range to Clipboard	**<Shift>-<Delete>** or **<Ctrl>-X** or **Edit** • **Cut**
	Copy selected range to Clipboard	**<Ctrl>-<Insert>** or **<Ctrl>-C** or **Edit** • **Copy**
	Paste range from Clipboard	**<Shift>-<Insert>** or **<Ctrl>-V** or **Edit** • **Paste**
	@SUM contiguous entries left of/above empty one-column/one-row selection or all entries of selection that has empty last column/row	Enter @SUM formula, cut and copy where appropriate
B	Boldface entries in selected range	**<Ctrl>-B**; or right-click range, Font & Attributes • **Bold**
I	Italicize entries in selected range	**<Ctrl>-I**; or right-click range, Font & Attributes • **Italics**
U	Underline entries in selected range	**<Ctrl>-U**; or right-click range, Font & Attributes • **Underline**
	Left-align entries in selected range	**<Ctrl>-L**; or right-click range, Alignment • **Left**
	Center entries in selected range	**<Ctrl>-E**; or right-click range, Alignment • **Center**
	Right-align entries in selected range	**<Ctrl>-R**; or right-click range, Alignment • **Right**
	Fill selected range with series based on values in first cell(s)	Right-click range, Fill by Example
	Select all drawn objects that a rectangle can enclose	Hold **<Ctrl>** or **<Shift>**, click each object
	Draw arrow	**Tools** • **Draw** • **Arrow**
	Draw rectangle	**Tools** • **Draw** • **Rectangle**
	Draw ellipse	**Tools** • **Draw** • **Ellipse**

Fold Here

SMARTICONS (continued)

Button	Task	Keyboard or mouse
abc	Create text block	**Tools** • **Draw** • **Text**
OK	Create macro button	**Tools** • **Draw** • **Button**
	Create chart using values in selected range	**Tools** • **Chart**
	Display next set of SmartIcons	**Tools** • SmartIcons, select from top drop-down list box, OK

ENTERING AND EDITING CELL DATA

A cell entry is a *label* (text) or a *value* (a number or formula). Values must begin with a number, +, –, $, @, (, #, or decimal point. To begin a label with one of these characters, type an alignment character first. To begin a formula with a cell address, range name, or worksheet file reference, type + first. As you type an entry, it appears in the cell and in the edit line's *contents box* (the edit line's larger gray box). To put the entry into the active cell, press **<Enter>**, click the edit line's Check button, or select another cell.

Align label left/center/right	Begin with '/^/"
Fill cell with repeating label	Begin with \
Enter relative cell address	Type it or select cell to reference
Make cell address absolute	**<F4>** until variation is reached
Select @function	**@<F3>**; or @Function button , List All. Optionally select **Category**. Double-click function; or select function, OK
Edit active cell (activate Edit mode)	**<F2>** or double-click cell or click inactive contents box
In Edit mode, erase selected characters	**<Delete>** or **<Backspace>**. **<Esc>** for entire line. **<Ctrl>-<Backspace>** for word left
In Edit mode, convert cell's formula to its current result	**<F9>**
Use existing range name in formula	Type name; or Navigator button , select name; or **<F3>**, select name, OK
Exit Edit mode (lose changes)	**<Esc><Esc>** or **<Ctrl>-<Break>** or X button

WORKING WITH RANGES

Select range smaller than entire row or column	Select corner. Hold **<Shift>**, select opposite corner; or drag to opposite corner
Select row/column	Click frame's row number/column letter
Select contiguous rows/columns	Select first row/column. Hold **<Shift>**, select last row/column; or drag to last row/column
Select collection of ranges	Select range, hold **<Ctrl>**, select next ranges
Select all cells in worksheet	Click intersection of row and column frame
Select same range in consecutive worksheets (3-D range)	Select range in first/last worksheet, hold **<Shift>**, click tab of last/first worksheet
Deselect range	**<Esc>** or click worksheet
Cut selected range to Clipboard	Cut SmartIcon or **<Shift>-<Delete>** or **<Ctrl>-X** or **Edit** • **Cut**
Copy selected range to Clipboard	Copy SmartIcon or **<Ctrl>-<Insert>** or **<Ctrl>-C** or **Edit** • **Copy**
Paste from Clipboard	Paste SmartIcon or **<Shift>-<Insert>** or **<Ctrl>-V** or **Edit** • **Paste**
Copy selected range to new location in same worksheet	Hold **<Ctrl>**, drag edge of range; or copy and paste

Fold Here

PC WORLD

Instant Reference Card #40

For use with PC World Instant Reference Card Portfolio

1-2-3 RELEASE 4.0 FOR WINDOWS

WORKING WITH RANGES (continued)

Move selected range	Drag edge of range or cut and paste
Erase selected range(s)	**<Delete>** or **E**dit • Clear
Insert/delete range shorter than entire column (cells selected/ below move down/up)	Select range, **<Ctrl>-<Gray Plus>**/**<Ctrl>-<Gray Minus>** or **E**dit • Insert/**D**elete, **I**nsert selection/**D**elete selection • OK
Insert/delete range narrower than entire row (cells selected/ to right move right/left)	Select range, **<Ctrl>-<Gray Plus>**/**<Ctrl>-<Gray Minus>** or **E**dit • Insert/**D**elete, **C**olumn • Insert selection/**D**elete selection • OK
Insert/delete selected row(s)/ column(s)	**<Ctrl>-<Gray Plus>**/**<Ctrl>-<Gray Minus>** or **E**dit • Insert/**D**elete
Name range	**R**ange • **N**ame, type name, OK
Name range(s) using label(s)	Select label(s), **R**ange • **N**ame • **U**se Labels, select from **F**or cells list, OK or Close
Delete range name	**R**ange • **N**ame, select name, **D**elete • OK
Wrap text in selected cell(s)	**S**tyle • **A**lignment • **W**rap text • OK
Set height of row or selected rows	**S**tyle • **R**ow Height or drag bottom row border in frame
Set width of column or selected columns	**S**tyle • **C**olumn Width or drag right column border in frame

Fold Here

Set width of column or selected columns to widest entry	Double-click right column border in frame
Hide column(s)/worksheet(s)	Select cell in column(s)/worksheet(s), **S**tyle • **H**ide • **C**olumn/**S**heet • OK
Format selected values	**S**tyle • **N**umber Format, select format, OK
Change selected range's font/font size	**S**tyle • **F**ont & Attributes, select from **F**ace/**S**ize list, OK
Show/don't show selected range's negative values in red	**S**tyle • **L**ines & Color • Show negative values in red • OK
Put/remove border around selected range/all range's cells	**S**tyle • **L**ines & Color • **O**utline/**A**ll • OK
Set horizontal (left/center/right) alignment of selected entries	**S**tyle • **A**lignment • **L**eft/**C**enter/**R**ight • OK or Left/Center/Right alignment SmartIcon
Set vertical (top/center/bottom) alignment of selected entries	**S**tyle • **A**lignment • **T**op/**C**enter/**B**ottom • OK
Copy selected range's format to another range	**E**dit • **C**opy, select new range, **E**dit • Paste **S**pecial • **S**tyles only
Protect/unprotect selected range's format	**S**tyle • **P**rotection • **K**eep data unprotected after file is sealed • OK, protect file

WORKING WITH WORKSHEETS

Turn undo on/off	**T**ools • **U**ser Setup • **U**ndo • OK
Undo last change if undo is on	Undo SmartIcon or **<Alt>-<Backspace>** or **<Ctrl>-Z** or **E**dit • **U**ndo
Rename worksheet	Double-click tab, type name, **<Enter>**
Go to intersection of last row and last column with entries	**<End>-<Home>**
Go to first nonempty cell before or after empty cell	**<End>, <Up>**/**<Down>**/**<Left>**/**<Right>**
Go to cell, named range, chart, drawn object, or query table	**<F5>**, select from **T**ype of item list, OK
Insert worksheet after current worksheet	New Sheet button [New Sheet]

WORKING WITH WORKSHEETS (continued)

Insert worksheet(s) before/after current worksheet	**E**dit • **I**nsert or **<Ctrl>-<Gray Plus>**, **S**heet, **B**efore/**A**fter, set **Q**uantity, OK
Go to worksheet	Click worksheet tab; or **<F5>**, type name and colon, OK
Go to next/previous worksheet	**<Ctrl>-<Page Up>**/**<Ctrl>-<Page Down>**
Move right/left one screen width	**<Ctrl>-<Right>**/**<Ctrl>-<Left>**
Go to cell A1/A:A1	**<Home>**/**<Ctrl>-<Home>**
Magnify/shrink worksheet 10%	**V**iew • **Z**oom In/Zoom **O**ut
Return to default display size	**V**iew • **C**ustom
Split worksheet beneath/to right of active cell	Drag Split bar or **V**iew • **S**plit • **H**orizontal/**V**ertical • OK
Unsplit worksheet	**V**iew • Clear Split
Print worksheet sideways	**F**ile • Page Setup • **O**rientation • Landscape
Cascade three worksheets	**V**iew • **S**plit • **P**erspective • OK
Move between panes or views	**<F6>**
Group/ungroup worksheets	**S**tyle • **W**orksheet Defaults • **G**roup Mode
Set default label alignment, column width, font, font size, text color, number of decimals	**S**tyle • **W**orksheet Defaults, set defaults, OK

Fold Here

WORKING WITH FILES

Create new file	**F**ile • **N**ew
Open existing file	Open File SmartIcon or **<Ctrl>-O** or **F**ile • **O**pen
Save open file	File Save SmartIcon or **<Ctrl>-S** or **F**ile • **S**ave
Change default file directory	**T**ools • **U**ser Setup • **W**orksheet directory
Close file	**<Ctrl>-<F4>** or **F**ile • **C**lose or double-click file window's Control box
Freeze title rows/columns/both above/left of selected range	**V**iew • Freeze **T**itles • **R**ows/**C**olumns/**B**oth
Unfreeze titles	**V**iew • Clear **T**itles
Print file or range	Print SmartIcon or **<Ctrl>-P** or **F**ile • **P**rint • OK
Preview printout of selected range	**F**ile • Print Preview • OK
Fit print range to single page	**F**ile • Page Setup • **S**ize • Fit all to page
Move to next/previous open file window	Hold **<Ctrl>**, **<End>**, **<Page Up>**/**<Page Down>**; or **<Ctrl>-<F6>**/**<Ctrl>-<Shift>-<F6>**
Protect/unprotect file	**F**ile • **P**rotect • **S**eal file • OK
Merge file into current file	**F**ile • **O**pen, select file, **C**ombine

WORKING WITH MACROS

Record macro	**T**ools • **M**acro • **R**ecord
Display transcript window	**T**ools • **M**acro • Show **T**ranscript
Play back transcript macro	**T**ranscript • **P**layback
Name macro	Select macro range, **R**ange • **N**ame
Create macro button	Macro SmartIcon or **T**ools • **D**raw • **B**utton
Run macro	**<Alt>-<F3>**, select name or range
Activate macro single-step mode	**T**ools • **M**acro • **S**ingle Step

Note: You can run a macro whose name begins with \ (backslash) followed by a single letter by holding **<Ctrl>** and pressing the letter key.

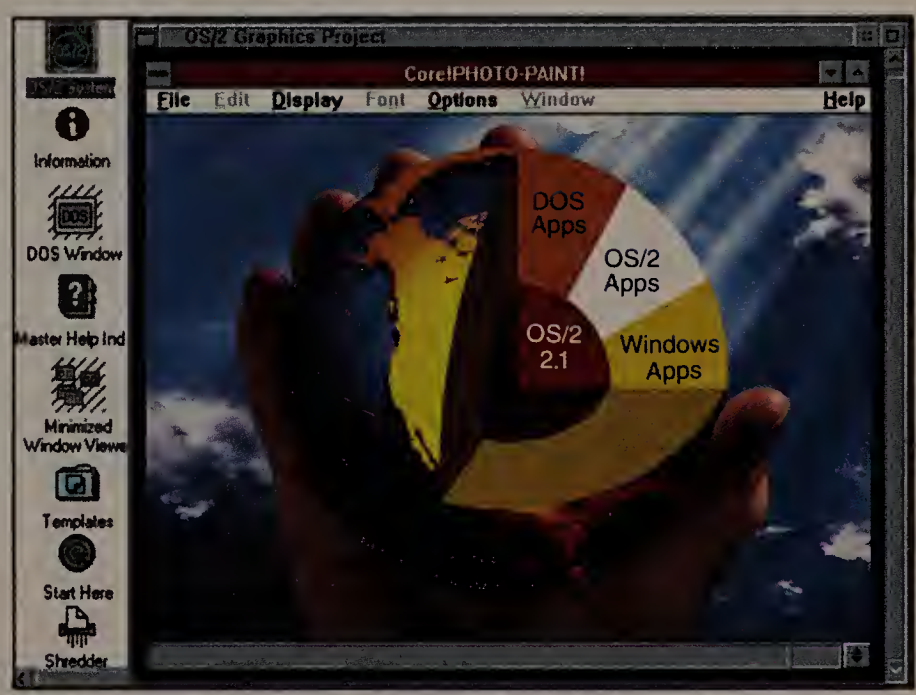
For use with PC World Instant Reference Card Portfolio

Now's your chance to run

Introducing Version 2.1

The new OS/2® 2.1 lets you run the latest Windows™ 3.1 applications, in addition to the DOS, Windows and OS/2 applications you're already running—almost any application in the PC universe. Now we've added TrueType fonts, select Windows applets, File Manager and Windows 3.1 printer and display driver support, including 32-bit seamless SVGA support.

You'll also get Advanced Power Management (APM) support for portables, improved multimedia support, pen-based capabilities, CD-ROM and AS/400® terminal emulation support. Plus all the features that made Version 2.0 an award-winner, like true pre-emptive multitasking, OS/2 Crash Protection™ and the easy-to-use object-oriented Workplace Shell™ interface. But now, you also get a new world of possibilities.

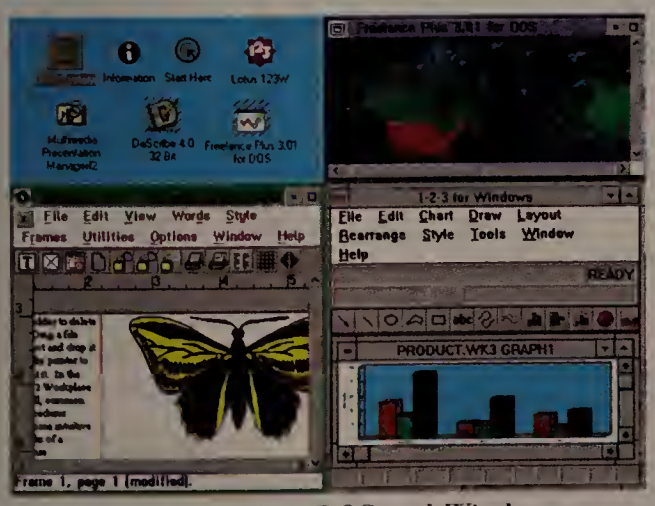


With OS/2 2.1 at the heart of your PC, you can run a world of DOS, Windows and OS/2 applications.

OS/2 2.1 is now also available on a single CD-ROM. It comes with exciting multimedia samplers, full-motion video demos and more. With our free demo diskette, you can find out even more about all the powerful features OS/2 2.1 has to offer. For your copy, to find out more about OS/2 2.1, or to order, call **1 800 3-IBM-OS2.** In Canada, call **1 800 465-7999.** OS/2 2.1 is also available at your local software dealer.

Demand OS/2 2.1 preloaded on your next PC.

Call for your free demo diskette.



There's no need to buy DOS and Windows to run DOS and Windows applications.

Operate at a higher level.™

the world.

IBM®

IBM, AS/400 and OS/2 are registered trademarks and OS/2 Crash Protection, Workplace Shell and "Operate at a higher level" are trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. TrueType is a trademark of Apple Computer, Inc.
©1993 IBM Corp.

Circle 123 on reader service card

Save Disk Space

PKZIP version 2.0

PC WORLD

WORLD CLASS AWARD

PKWARE introduces the next generation of its award winning compression utility, giving even greater performance levels than achieved with previous releases of the software. PKZIP compresses and archives files, saving disk space and reducing file transfer time.

Software developers, you can significantly reduce product duplication costs by decreasing the number of disks required to distribute your applications. Call for Distribution License information.

Put Your Executables on a Diet

Software Developers, save disk space and media costs with smaller executables. You can distribute your software in a compressed form with PKLITE Professional.™ PKLITE Professional also gives you the ability to compress files so that they cannot be expanded by PKLITE, hindering reverse engineering of your programs.

PKLITE increases your valuable disk space by compressing executable (.EXE and .COM) files by an average of 45%. The operation of PKLITE is transparent, all you will notice is more available disk space!

Compression for YOUR Application

The PKWARE Data Compression Library™ allows you to incorporate data compression technology into your software applications. The application program controls all the input and output of data, allowing data to be compressed or extracted to or from any device or area of memory.

All Purpose Data Compression Algorithm compresses ASCII or Binary data quickly. An adjustable dictionary size allows software to be fine tuned for maximum compression or speed. The routines can be used with most popular languages, such as C, C++, Pascal, Assembly, Basic and Clipper.

PKWARE® INC.

The Data Compression Experts

9025 N. Deerwood Drive Brown Deer, WI 53223
(414) 354-8699 Fax (414) 354-8549
Internet: pkware.inc@mixcom.com

PKZIP $47.00 PKLITE $46.00 PKLITE Professional $96.00
Please add $3.50 S&H per package in the US & Canada, $5.00 overseas
Wisconsin residents add 5% state sales tax & applicable county sales tax
Visa and Mastercard accepted, or COD money.

PCW 9/93

Circle 212 on reader service card

There's still something you have to do before you can print the document—generate the references. And yes, you must do this every time you make a change to the document that increases or decreases the total number of pages.

So why is this method better than running a macro? You don't have to *remember* to generate the references; WordPerfect will remind you if you forget and try to print after editing. To generate the references, press **<Alt>-<F5>GGY**.

Ralph D. Jones, Hagerstown, Maryland

How to Get a Date in 1-2-3

When you import a text file into 1-2-3 with the /File•Import•Text command, you may have trouble using any dates from the file. Why? Because 1-2-3 imports them as labels. Luckily, you can use a formula to convert them. For instance, if the date is in the YYMMDD format, and it appears on a line by itself in the text file (and therefore in a cell by itself in the worksheet), you can use the formula **@DATE(@VALUE(@MID(*cell*,0,2)), @VALUE(@MID(*cell*,2,2)), @VALUE(@MID(*cell*,4,2)))**, replacing *cell* with the address of your date text. To convert a column of dates, enter the formula in a cell to the left or the right of the topmost date, then copy the formula down to the other cells in the column.

Note that you may need to set the range's format to make the date appear as a date rather than just a number. For example, if you use the Format•Date•Long Intn'l command to format the cell, the date will appear as something like '09/20/93'.

Mindy Moy, Brooklyn, New York

Editor's note: Moy's tip works great if the date is expressed in a 6-digit format—and if it isn't, the formula can be converted easily. However, you might want to consider importing your text with the /File•Import•Numbers command, which imports numbers and quoted text. Instead of importing each line of the input file into a single cell, this alternative breaks the line up into several columns. The only catch: You must add quotation marks to each item that's not a number, or it will be ignored.

When you use the Numbers option to import a date written with slashes (e.g., 9/20/93) and without quotation marks around it, 1-2-3 will split the date into three numbers in adjacent columns. For instance, you might end up with the month in cell

Macintosh PowerBook 160

~~Price~~
~~$2,429~~

New Catalog Price
$1,609.00

Processor
25-MHz 68030

Memory
4MB of RAM, expandable to 14MB

Disk Storage
1.4MB internal Apple SuperDrive
40MB internal hard disk drive

Networking
Built-in LocalTalk connection; AppleTalk networking software

Display
Built-in 10-inch (diagonal) backlit supertwist LCD; 16 levels of gray: 640 by 400 pixels. Connects directly to many external Apple monochrome and color displays, VGA displays, and large projection monitors

Expansion Capabilities
Two slots: one for a modem, one for RAM: supports up to six SCSI devices

Sound
Input port, output port; built-in microphone

Additional Ports
Two serial ports, SCSI port, ADB port, power adapter port, video-output port. With optional SCSI disk adapter, SCSI port allows direct connection to another Macintosh for fast file transfer

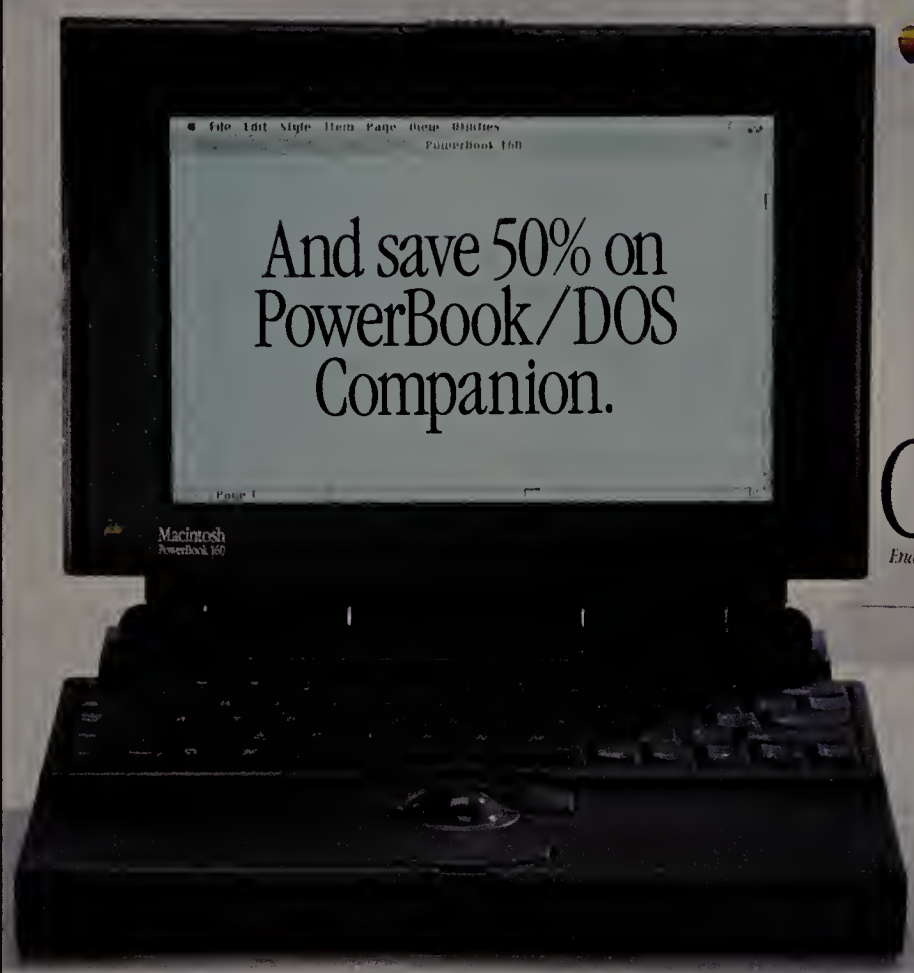
Internal Modem
Optional Fax/Data Modem or Express Modem

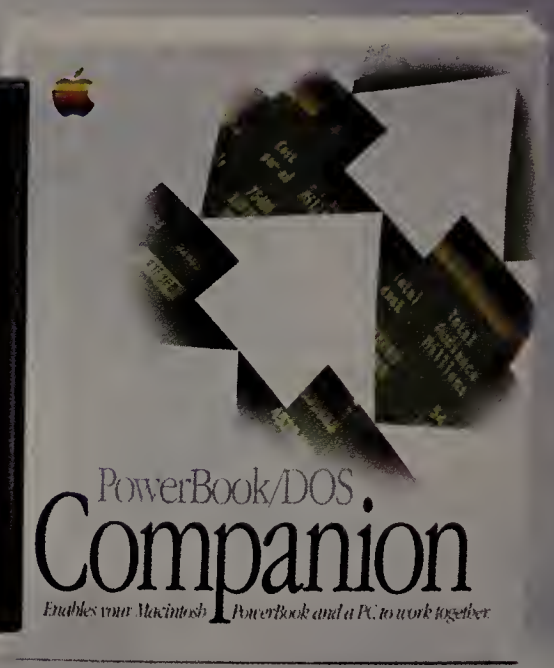
Batteries
Nickel-cadmium; average life 2.5 to 3 hours; power adapter included

Size
9.3 by 11.25 by 2.25 in.

Weight
6.8 lb.

Call for your PowerBook today. Connect to your DOS computer tomorrow.





For new lower PowerBook prices, call
1-800-795-1000, ext. 365,
and enjoy free overnight delivery.*

After adding every possible feature to the Macintosh® PowerBook,™ we found room for one more. A seamless connection with DOS computers. Just call *The Apple® Catalog,* and you'll enjoy free overnight delivery of the PowerBook and PowerBook/DOS Companion,™ four invaluable hardware and software connectivity products.

The PowerBook 160 is one of our most versatile computers. It packs more power and speed than many desktop computers into one of the smallest, most innovative computers ever designed. It sports a bright, 16-level gray-scale display that lets you work with photographic-quality images. And with PowerBook/DOS Companion, it works well with your DOS computers.

You'll be able to open and use DOS files on your PowerBook. Connect to PC printers. Swap and convert files between your PowerBook and any PC. And because the PowerBook 160 features the most flexible built-in video support of any notebook, you can even use your VGA or SVGA monitor.

PowerBook/DOS Companion, valued at $219, is offered at a 50% savings with your purchase.† This special offer is also good on the PowerBook 145, our new color PowerBook 165c, or the PowerBook Duo™ 210. And with every order you'll enjoy toll-free lifetime support, a one-year limited warranty with mail-in service, and a 30-day, money-back guarantee. In short, you'll have direct access to exceptional Apple service.

Call 1-800-795-1000, ext. 365, with a major credit card‡ to order your PowerBook today. And enjoy taking along the perfect traveling companion tomorrow.

*Call 24 hours a day, 7 days a week. If you call before 12 midnight eastern time, Monday through Friday, we'll deliver in-stock items the next business day at no charge. Order Saturday or Sunday, and we'll deliver by Tuesday. For the deaf and hearing impaired, call 1-800-755-0601. †Based on suggested retail price. Offer good only through *The Apple Catalog* and expires 9/30/93. ‡VISA, MasterCard, and American Express accepted. © 1993 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, and Macintosh are registered trademarks of Apple Computer, Inc. PowerBook, PowerBook Duo, and PowerBook/DOS Companion are trademarks of Apple Computer, Inc. MS-DOS is a registered trademark of Microsoft Corporation. Product information and prices are subject to change without notice.

Apple®

Have you heard about the new Apple Catalog? We've saved one for you.

Apple® will give you free delivery on everything from a PowerBook™ to a mug. And most items will arrive the next business day*. Just call toll-free 1-800-795-1000, ext. 325, 24 hours a day, 7 days a week. Or you can send this ad to:

The Apple Catalog
One Apple Plaza
P.O. Box 9001
Clearwater, FL 34618-9001

Name _____

Address _____

City _____ State _____

Zip _____ Phone No. ( ) _____ Ext. 325

*©1993 Apple Computer, Inc. Apple and the Apple logo are registered trademarks of Apple Computer, Inc. PowerBook is a trademark of Apple Computer, Inc. Offer good while supplies last. Good only in the United States. Allow 1-2 weeks for the Apple Catalog to arrive. *Items ordered Saturday and Sunday will be delivered Tuesday. Items valued at under $50 will not arrive the next business day.*

TELL ME MORE!

FREE information on the products featured or advertised in *PC World* can be requested using the postage-paid Reader Service Card found in this issue.

PC WORLD


```
Sub Pause (sec%)
If sec%<1 Then Exit Sub
If sec%>59 Then sec%=59
start%=Second(Now)
finish%=start%+sec%
If finish%>59 Then finish%=finish%-60
Do Until Second(Now)=finish%
Loop
End Sub
```

FIGURE 5: PAUSE A VISUAL BASIC PROGRAM for a set number of seconds with this routine.

A1, the day in B1, and the year in C1. Then a very simple formula, **@DATE(C1,A1,B1)**, will give you the date you need.

A Visible Pause in Visual Basic

While writing a program in Visual Basic for Windows, I discovered a serious omission: There's no built-in routine to let you pause the program for a predetermined amount of time. I therefore wrote a subroutine to pause the program for up to 59 seconds.

To create PAUSE, make sure the code window is open, select *View•New Procedure*, make sure 'Sub' is selected, enter the name **PAUSE**, press **<Enter>**, and enter the routine [see **FIGURE 5**]. To use it, simply place the command **PAUSE (*n*)** in your code, replacing *n* with the length of the desired pause in seconds.

Igor Fokine, Glassboro, New Jersey

Editor's note: It's a pity that Microsoft couldn't add something as simple and useful as a Pause routine to Visual Basic. The program's closest equivalent, a control called a *timer*, is too awkward for simple delays. Fokine's technique is a much easier solution to the problem.

I've modified the subroutine slightly to make it run more smoothly if you pass it a number that's outside the 1-to-59-second range. If the number you pass it is 0 or less, the pause will end immediately; if it's over 59, the pause will last 59 seconds. You'll find the subroutine, an ASCII text file called PAUSE.TXT, in the Featured in September folder on PC World Online.

By Brett Glass

Brett Glass is a contributing editor for PC World. Star-Dot-Star *welcomes your tips, macros, batch files, and short programs. See page 12 for contact information.*

FAX SURVEY

Win an Optical Drive

Fax in your opinions to enter a drawing for an Ocean Microsystems 256MB rewritable drive.

Which articles in *PC World Lotus Edition* are valuable to you? Which aren't? Help us improve the magazine by filling out the questionnaire below. Fax in your response and you'll have a chance to win an Ocean Microsystems Vista 256, a Best Buy in this month's review of rewritable optical drives.

HOW TO ENTER: Fax your completed questionnaire, along with your name and phone number, to *PC World* at 415/267-1779. If you have trouble connecting to this number, fax your survey to 415/974-7445 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Lotus Edition Fax Survey, Box 9-LOT, *PC World*, 501 Second St. #600, San Francisco, CA 94107. Send your survey in no later than September 30; we'll notify the winner by mid-October.

HOW TO FILL OUT THE FORM: FOR BEST RESULTS, PHOTOCOPY THIS PAGE; DO NOT TEAR IT OUT. Using black pen, clearly print your name (use block capital letters) and phone number at right; fill the appropriate circle under each digit of your phone number. Below, fill the circles under the answers that apply to each article you read. First tell us whether you read the entire article or just some of it. If you didn't read it at all, leave the line blank. If you read the article, please rate its value to you on a scale from 1 (least valuable) to 5 (most valuable). WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person.

First name

Last name

Daytime phone number

1	○	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○	○

If you would prefer not to receive information about new products, please check this box. ○

	Did you read it?		Value to you? (Least 1 – Most 5)				
	All	Some	1	2	3	4	5
Sample	◉	○	○	○	○	○	◉
In This Issue (page 15)	○	○	○	○	○	○	○
Letters (page 23)	○	○	○	○	○	○	○
Consumer Watch (page 29)	○	○	○	○	○	○	○
Real Problems, Real Solutions (page 35)	○	○	○	○	○	○	○
Business Fixtures (page 39)	○	○	○	○	○	○	○
Top of the News (pages 52–66)	○	○	○	○	○	○	○
New Products (page 71)	○	○	○	○	○	○	○
Lotus News (page 98-L2)	○	○	○	○	○	○	○
Top Add-Ons for 1-2-3 (page L4)	○	○	○	○	○	○	○
Financial Formulas That Lotus Forgot (page L13)	○	○	○	○	○	○	○
Make Your Worksheet a Team Player (page L18)	○	○	○	○	○	○	○
Improving Your Skills (page L22)	○	○	○	○	○	○	○
1-2-3 Tips (page L24)	○	○	○	○	○	○	○
Macro Basics (page L29)	○	○	○	○	○	○	○
Advanced Macros (page L31)	○	○	○	○	○	○	○
Q&A (page L34)	○	○	○	○	○	○	○
Suite Success (page L37)	○	○	○	○	○	○	○
Improvisation (page L38)	○	○	○	○	○	○	○

	Did you read it?		Value to you? (Least 1 – Most 5)				
	All	Some	1	2	3	4	5
486 PCs With the Works (page 102)	○	○	○	○	○	○	○
MO Drives: Storage for the Masses (page 135)	○	○	○	○	○	○	○
Instant Payback Software (page 148)	○	○	○	○	○	○	○
Backup Software: Cheap Insurance (page 164)	○	○	○	○	○	○	○
Windows DTP Comes of Age (page 186)	○	○	○	○	○	○	○
Finding the Perfect Touch (page 213)	○	○	○	○	○	○	○
Help Line (page 228)	○	○	○	○	○	○	○
Spreadsheets (page 242)	○	○	○	○	○	○	○
Word Processing (page 248)	○	○	○	○	○	○	○
Windows (page 252)	○	○	○	○	○	○	○
Data Management (page 256)	○	○	○	○	○	○	○
Publishing & Presentations (page 260)	○	○	○	○	○	○	○
Communications (page 264)	○	○	○	○	○	○	○
Hardware (page 270)	○	○	○	○	○	○	○
Star-Dot-Star (page 274)	○	○	○	○	○	○	○
Reference Card: 1-2-3 4.0 for Windows (page 277)	○	○	○	○	○	○	○
Games: Break Time (page 317)	○	○	○	○	○	○	○
Home Office (page 320)	○	○	○	○	○	○	○
HOW WOULD YOU RATE THIS ISSUE OVERALL?			○	○	○	○	○

Do you have a business problem you need to solve with 1-2-3 or another Lotus application? Are you struggling with a spreadsheet model or macro? Tell us about it—jot down your problem here or send a note to Submissions Editor, *PC World Lotus Edition*, 77 Franklin St. #300, Boston, MA 02110.

PLEASE FAX TO 415/267-1779

Arlington Computer Products . . . Great Prices and Service Since 1984!

- PC Magazine "*. . .Arlington offers worry-free mail order purchasing!*"
- PC Sources Product Review"*. . .You can be confident that what you order will work as soon as it arrives!*"
- PC Computing Phantom Shopper "*. . .Courteous service and terrific technical support!*"

HEWLETT-PACKARD

Laserjet IV w/Toner $1369
Laserjet IIIP w/Toner..... $879
Laserjet IV L w/Toner $675
Laserjet IV SI w/Toner .. $2999
Laserjet IV M $1929
2MG Upgrade $99
4MG Upgrade $149
8MG Upgrade $279
Deskjet 500/500C $359/509
Deskjet 550C $699
Deskjet 1200C $1379
Pacific Page/XL..... $259/$699

Panasonic Office Automation

1124I . $249 1654 .. $519
2023 .. $199 2624 .. $349
2123 .. $229 4410 .. $569
2124 .. $295 4430 .. $649
2180 .. $169 4450I . $949
1624 .. $329 4455 . $1659
4410/4450I 2 MG...$125

Canon

Notejet 486/with Built-In Printer..... CALL

Canon

BJ-10EX $239
BJ-200 ..... $299
BJ-230 ..... $395
BJ-300 ..... $325
BJ-300 Cart..... $19
BJ-330 ..... $489
BJC-800 ..... $1449
BJC-820 ..... $1579
LBP-4SX $669
LBP-8SX $1289

BJ-200

• 360 dpi. • 4 PPM

EPSON PRINTERS

LX810..... $169
FX870..... $259
FX1170.... $345
LQ570+ ... $232
LQ870 .... $425
LQ1070 ... $339
LQ1170 ... $589
LQ2550 ... $859
EPL8000 .. $819
DFX5000.... $1299
DFX8000.... $2159
Stylus 800 ... $299*
Action 3250 .. $169
Action 1000 .. $599
Action 1500 .. $649

NO SURCHARGE FOR CHARGE CARDS!

*After rebate.

OKIDATA

ML320 .. $295 ML395 .. $959
ML321 .. $415 3410... $1199
ML380 .. $209 OL400 .. $539
ML520 .. $369 OL810 .. $899
ML590 .. $415 OL830 . $1089
ML591 .. $569 OL850 . $1199
OL400 2MB...$129

TEXAS INST.

TM 4000/WINSX 120 .. $1879
TM4000/WINDX 120 ... $2389
TM4000/WINSX Color . $2569
TM4000/WINDX 2 50 .. $2975
LASER PS17 ..... $1029
LASER PS23 ..... $869
LASER PS65 ..... $1099

NETWORKING

Netware 3.11 5 User $555
Netware 3.11 10 User .. $1249
Netware 3.11 20 User .. $1589
Netware 3.11 50 User .. $2349
Lantastic Starter 4.0 .... $445
E143 Ethernet $185
NE2000 ..... $129
SMC Hub T/P $339
SMC Hub Coax $225
Ethercard +/+16 .... $89/$115
3 Com EtherLink II $179
Intel Ether 16 ..... $95
Intel Ether 16-5 Pak $429
Intel Ether 16-20 Pak .. $1639
Intel Token Express $479
Irma Board 3..... $399

SCAN. & DIGIT.

Epson 600C..... $779
Epson 800C..... $1069
Logitech ScanMan $135
Logitech ScanMan 256 . $229
Mustek Color Artist..... $289
Summasketch 12×12.... $255
Summasketch 12×18.... $499

NEC

P3200/3300 ..... $225/$325
P6200/6300 ..... $399/$599
P9300 ..... $825
Model 95 Pscrpt Laser .. $889
Model 95FX Laser $1119

MONITORS

NEC

3 FGE $579
4 FGE $679
5 FG..... $1245
5 FGE $1049
6 FG..... $2249

MITSUBISHI

EGA..... $239
Diamond Pro 17..... $1019
HL6955 20" $1759

PANASONIC

1381 VGA 1024×768 .... $319
1395 VGA 1024×768 .... $429
1991 VGA 1280×1024 .. $1539

VIDEO BOARDS

ATI Graph Ultra + 2MG . $229
ATI Graph Prof 1 MG... $329
ATI Graph Prof 2 MG... $339
Diamond Stealth Pro ... $239
1024 VGA 16 Bit 1 MG... $79

CHIPS

256K/1 MG Chips each $3/$5
256K/1MB Simms ... $15/$39
4MB Simms $139
Epson Action 2 MG $99
HP 2MG Upgrade $99
OKI Laser 2MB..... $129

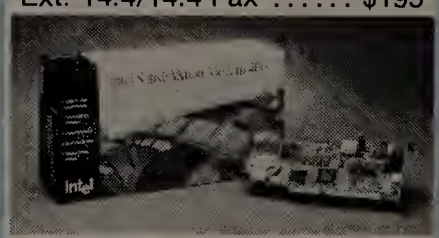
intel

80387 SX-16/20/25 ..... $75
80387-16/20/25/33..... $85
Overdrive SX20/25 $309/$409
Overdrive SX33 ..... $529
Overdrive DX25/33 $409/$529

MODEMS

intel

Int. 14.4/14.4 Fax $165
Ext. 14.4/14.4 Fax $195



SatisFAXtion MODEMS

100 2400/9600 Fax $99
200 2400 V.42/9600 Fax . $269
300 14.4/9600 Fax $219
400 14.4/14.4 Fax..... $365
400 Ext 14.4/9600 Fax .. $365

Hayes

Hayes Accura 96/Fax... $219
Hayes Accura 14.4/Fax . $245
Hayes Optima 96..... $309
Hayes Optima 14.4/Fax . $369
Hayes Ultra 96 ..... $539
Hayes Ultra 96 14.4..... $589

PRACTICAL PERIPHERALS

Practical Per. 2400 Int.... $69
Practical Per. 9600 Int... $169
Practical Per. 9600 Ext. . $179
Practical Per. 14.4 Int. .. $185
Practical Per. 14.4 Ext... $195
Practical Per. 14.4 Pocket $325
Practical Per. FaxMe ... $169

U.S. Robotics

16.8 HST Ext. $459
14.4 Dual Std. 16.8 ..... $659
Sportster 14.4 Int. $155
Sportster 14.4 Ext..... $175
Sportster 14.4 Int. Fax .. $175
Sportster 14.4 Ext. Fax . $195
Worldport 14.4 ..... $339

SOFTWARE

Aldus Pagemaker $489
Corel Draw $369
Lotus 123 2.4/3.1 .. $325/$389
Microsoft Windows 3.1 .. $69
Microsoft DOS 6.0 Upg. . $59
Word Perfect 5.1 ..... $279
Word Perfect Windows . $279

DRIVES & TAPES

Toshiba 3½" 1.44..... $69
Iomega 250 ..... $199
Irwin 120/250 ..... $169/$199
Irwin Parallel 250..... $409

COLORADO

Colorado Jumbo 120 ... $145
Colorado Jumbo 250 ... $169
Colorado Trakker 120 .. $289
Colorado Trakker 250 .. $325
Colorado 2GB Ext. $1099

AMERICAN UPS

250 ..... $109 600..... $259
400 ..... $159 900..... $369
450 ..... $189 1250.... $729

CD ROM OPTICAL DISKS

Intel Video Recorder ... $459
Media Fusion CD-16.... $485
Media Vision Pro 16 .... $949
Sony CDU 535 Int. $279
Sony 7205N Ext. $455

SEAGATE HARD DISKS

40 MB for AT (ST251-1) $229
80 MB for AT (4096).... $279
106 MG 3120A $179
120 MG 3144A $189
245 MG 3283..... $279
260 MG 3290A $259
452 MG 3550A $489

PLUS HARD CARD

85 MB/127 MB .... $229/$249
240 MB $395

CONNOR HARD DRIVES

120 MB/174 MB $199/219
209 MB/540 MB ... $289/$879

Arlington Computer Products, inc.

Prices and availability subject to change without notice. Purchase orders accepted from Qualified Customers.

HOURS C.S.T.
7:30 - 7:30 pm - Mon.-Fri.
9:00 - 5:00 pm - Saturday

1970 CARBOY
MT. PROSPECT, IL 60056

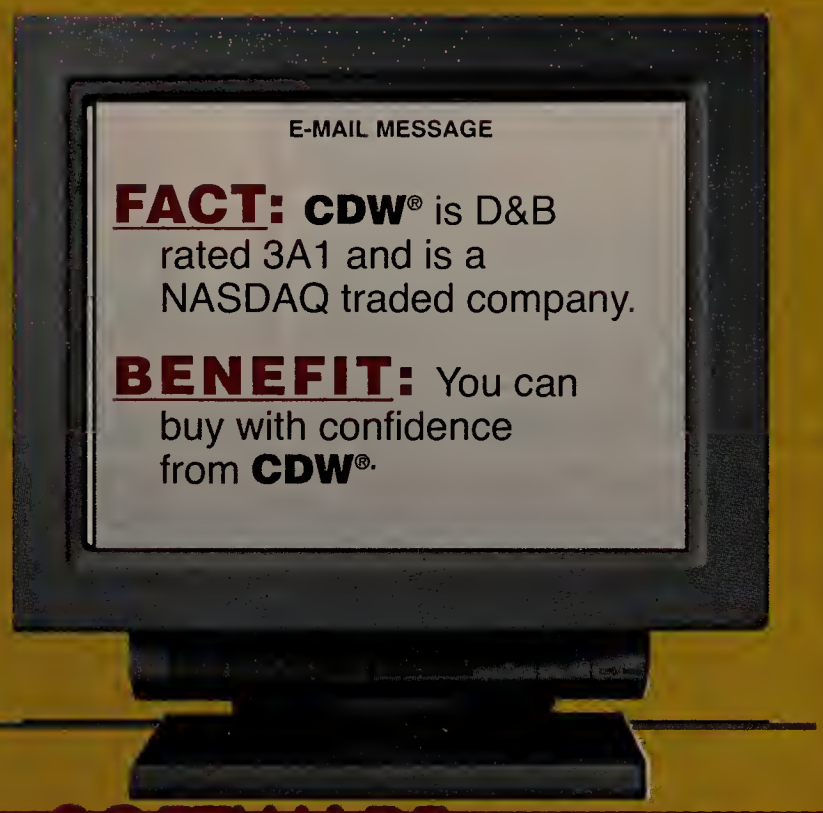
FOR ORDERS & QUOTES: **800-548-5105**

VISA MasterCard DISCOVER

CUSTOMER SERVICE AND IN ILLINOIS 708-228-6333
SHIPPING 708-228-9748
TECHNICAL ASSISTANCE 708-228-1470
We Export! FAX 708-228-0516

COMPUTER DISCOUNT WAREHOUSE™

ANOTHER FACT ABOUT COMPUTER DISCOUNT WAREHOUSE™

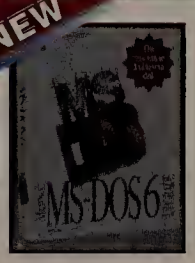


WHY PAY RETAIL? CDW® SELLS SOFTWARE FOR LESS!

NEW

WordPerfect 6.0 For DOS Upgrade
ONLY $99.17
29431

NEW



MICROSOFT DOS V6.0 Upgrade
ONLY $47.75
27696
(While Quantities Last)

NEW

Lotus 1-2-3 Release 4 Upgrade
ONLY $93.44
29308

WordPerfect for Windows 5.2 Upgrade
ONLY $77.59
26514

5TH GENERATION DISKLOCK V2.0
5TH GENERATION DIRECT ACCESS
5TH GENERA TION FASTBACK PLUS V3.1
5TH GENERATION FASTBACK WIN
ADOBE PHOTOSHOP FOR WIND V2.5
ADOBE WIN TYPE MGR V2.01
ALDUS PAGEMAKER V5.0
AUTOMAP ROAD ATLAS
APPROACH WIN COMP UPG
ARTISOFT ARTICOM MODEM SHARING
AUTODESK 3D CONCEPTS V1.0
AUTODESK AUTOSKETCH WIN
AUTOSKETCH V3.0
BANNER BLUE ORG ADV V6.0
BERKELEY AFTER DARK WIN
BITSTREAM FACELIFT WORDPERFECT
BLOC PUBL FORMTOOL GOLD
BORLAND PASCAL OBJECTS V7.0 3.
BORLAND TURBO PASCAL V7.0
BORLAND C++ APP FRAMEWORK V3.1
BORLAND C++ 3.1 WIN/DOS
BORLAND TURBO C + + DUAL V3.0
BORLAND BRIEF V3.1
BORLAND PARADOX 4.0 UPG
BORLAND PARADOX 4.0
BORLAND PARADOX 4.0 NODE
OUATTRO PRO 4.0 WIN COMP UPG
BORLAND OFFICE WIN 1.0 UPGRADE
BORLAND TURBO C++ VISUAL ED WIND
BORLAND DBASE COMPILER V1.0
BORLAND DBASE IV 2.0 LIC/NODE
BORLAND DBASE IV 2.0 UPG
BORDERBUND WIN PRINTSHOP DELUXE
BRODERBUND PRINT SHOP DELUXE
CAERE OMNIPAGE PROFESSIONAL V2
CENTRAL POINT V1.4 ANTIVIR
CENTRAL POINT PC TOOLS V8.0 3
CENTRAL POINT PC TOOLS WIN
CALERA WORDSCAN PLUS
CNS ACT WIN
CNS ACT SOFTWARE 2.1
CA CLIPPER COMP UPRADE
CA CLIPPER V5.2
COREL SYSTEMS DRAW V3.0
COREL DRAW V4.0 CD & 3.5
COREL SCSI PRO V2.0 SINGLE
COREL SCSI SOFTWARE DRIVERS ON
CLARIS WORKS FOR WINDOWS V1.0
CLARIS FILEMAKER PRO WINDOWS
DAC EASY ACCOUNTING V4.3
DCA CROSSTALK 16 VERSION 3.8

DCA CROSSTALK WIN V2.0
DELRINA DOSFAX PRO
DELRINA WINFAX PRO COMMMUNICATION P
ECLIPSE FAX WITH OCR
XTREE WIN
XTREE GOLD V2.55 5.25/3.5
GENERIC CADD V6.0
GRYPHON MORPH FOR WINDOWS
HEWLETT PACKARD DASHBOARD WIN
HAYES SMARTCOM WIN
IBM OS/2 V2.1
IBM OS/2 V2.0 3.5 OPERATING SO
INTUIT QUICK PAY DOS/WIN 2.0 D
INTUIT QUICKEN WIN V2.0
INTUIT QUICKBOOK
INTUIT BUNDLE QUICKBOOK & QUIC
INTUIT QUICKEN 6.0
KODAK PHOTO CD ACCESS
KODAK ACCESS PHOTO CD/WINDOWS
LOTUS OS/2 123 V2.0 SINGLE W/D
LOTUS CC:MAIL 10 USER PACK
LOTUS CCMAIL EXP 25 USER V4.0
LOTUS SMARTEXT BUILDER V2.0 SINGLE
LOTUS SMARTEXT READER V2.0 SINGLE
LOTUS V3.4A UPGRADE
LOTUS 123 V2.4 UPG LIC PAC
LOTUS 123 RELEASE 4 UPGRADE
LOTUS 123 V2.4
LOTUS 123 2.4 SERVER
LOTUS 123 V2.4 NODE
LOTUS 123 2.4 UPG RADE KIT
LOTUS 123 WIN
LOTUS 123 WIN UPGRADE
LOTUS AMIPRO 3.0 COMP UPG
LOTUS AMI PROFESSIONAL 3.0
LOTUS AMI PRO VER UPG 3.0
LOTUS IMPROV 2.0 3.5
LOTUS ORGANIZER V1.0
LOTUS WORKS V3.0 DUAL MEDIA
MECA MANAGING YOUR MONEY V9.0
MERIDIAN CARBON COPY PLUS V6.1
MERIDIAN CARBON COPY WIN
DATASTORM PROCOMM PLUS V2.01
DATASTORM PROCOMM PLUS WIN
MICROGRAFX ABC FLOWCHARTER V2
MICROSOFT V6.1 MACRO ASSEMBLER
MICROSOFT OFFICE UPG
MICROSOFT FLIGHT SIMULATOR 4.0
MICROSOFT WORD V6.0
MICROSOFT VISUAL BASIC V3.0 DOS
MICROSOFT C COMPILER 7.0

MICROSOFT COMP UPG VISUAL C++
MICROSOFT VISUAL C++ PRO UPG
MICROSOFT VISUAL C++ PROF
MICROSOFT WINDOWS 3.1 UPG
MICROSOFT WORD WIN V2.0
MICROSOFT SCHEDULE + WIN
MICROSOFT EXCEL 4.0
MICROSOFT EXCEL COMP 4.0 UPG 3
MICROSOFT EXCEL 4.0 WIN LICENS
MICROSOFT MAIL 5 NODE LICENSE PACK
MICROSOFT DOS UPGRADE V6.0
MICROSOFT DOS V6.0 3 PACK DUAL
MICROSOFT TEST TOOLS WIN V2.0
MICROSOFT PUBLISHER V2.0 WINDOWS
MICROSOFT VISUAL BASIC COMP. UPGRAD
MICROSOFT V3.0 VISUAL BASIC WIN UPG
MICROSOFT VISUAL BASIC PRO
MICROSOFT VISUAL BASIC V3.0 3.5
MICROSOFT WORKGROUP ADD STARTE
MICROSOFT WORKGROUP ADD-ON USE
MICROSOFT WORKGROUP ADD-ON 3.5
MICROSOFT WORKGROUP ADD-ON 5 P
MICROSOFT WIN PRINTING SYSTEM
MICROSOFT FOXPRO WIND 2.0 TO 2.5 UPG
MICROSOFT FOXPRO V2.5 COMP WIN
MICROSOFT FOXPRO DOS 2.0 TO
MICROSOFT FOXPRO WIN UPG 6 Pk
MICROSOFT FOXPRO WIN DIST KIT
MICROSOFT FOXBASE+ V2.1 DOS
MICROSOFT VIDEO WIN
MICROSOFT MULTIMEDIA VIEWER 2.0
MICROSOFT PROFIT WIN V1.0
MICROSOFT VISUAL C++ V1.0
MICROSOFT VISUAL CONTROL PACK
MICROSOFT VISUAL TOOLS SUITE V1.0
MICROSOFT EFORMS DESIGNER WIN
MICROSOFT OFFICE WIN V3.0
MICROSOFT OFFICE LICENSE PACK
MICROSOFT POWERPOINT WIN 3
MICROSOFT PROJECT/WINDOWS LICP
MICROSOFT TRUE TYPE FONT PACK
MICROSOFT 3.5 WORD WIN UP
MICROSOFT WIN SOUND SYSTEM
MICROSOFT WINDOWS 3.1
MICROSOFT WORKS
MICROSOFT WORKS WIN
NORTON LAMBERT CUST & SUPPORT
FLOW CHARTING III V2.10 SERVER
PIXAR TYPESTRY WIN
POLARIS PACKRAT V5.0
POWERUP CALENDAR CREATOR PLUS

POWERUP CALENDAR CREATOR + WIN
QUALITAS 386 MAX V6.0
QUALITAS 386 MAX V7.0
QUARTERDECK DESQVIEW/X
QUARTERDECK DESQVW 386 V2.4
QUARTERDECK QEMM V6.0
QUARTERDECK QEMM 386 FLIXIPAO
SPC HARVARD GRAPHICS 3.0
SPC HARVARD GRAPHICS WIN V1.03
SPC HARVARD GRAPHICS WIN V1.03 UPG
SPC PFS PRO WRITE V2.2
SABER LAN WORKSTATION V1.0
SABER LAN WORKSTATION NODE LIC
SHAPEWARE VISIO V1.0 WIN
SPINNAKER PFS WIN WORKS
STORAGE DIMENSIONS SPEEDSTOR
STACKER V3.1 WINDOW/DOS DUAL MEDIA
SYMANTIC GUIDE LINE FOR WINDOWS
SYMANTIC GRANDVIEW
PC ANYWHERE HOST & REMOTE
PC ANYWHERE HOST & REMOTE
PC ANYWHERE V4.5LAN HOST REMOTE
SYMANTEC 2.1 ANTI VIRUS
SYM NORTON B/UP V2.0 WIN
SYMANTEC DESKTOP WIN
SYMANTEC NORTON UTILITIES V7.0
SYMANTEC PC ANYWHERE WIN
SYMANTEC O&A 4.0
SYMANTEC O&A LAN PACK 4.0 3USE
TOUCHSTONE CHECK IT PRO DUAL
THE VOYAGER COMPANY JURASSIC PARK
W-P OFFICE 3.1 ADD LIC NO MEDIA
WORDPERFECT V6.0 ADDITIONAL LICENSE.
WORD PERFECT OFFICE V4.0 ADD'L LIC.
WORDPERFECT OFFICE V4.0 20PK LIC
WORDPERFECT DOS NODE W/DOC
WORDPERFECT WIN 5.2 NODE W/DOCS
WORDPERFECT VER 5.1
WORDPERFECT PRESENTATION V2.0
WORDPERFECT WINDOWS VER 5.2
W-P HEBREW LANGUAGE MOD V5
WORDPERFECT LETTER PERF ECT
WORDPERFECT OFFICE V3.1 DUAL M
W-P DOS/WIND/OS2 NODE W/O MANUA
WORDPERFECT COMP UPG V5.2
WORDPERFECT 5.1 UPG
WPERFECT PRESENTATION UPG TO V2.0
WORDPERFECT V6.0 DOS UPGRADE
WORDPERFECT WIND 5.2 UPGRADE
WORDPERFECT UPG KIT 5.1 TO 5.2

CDW® HOURS
Sales:7:30-7:30 CDT Mon-Fri. /9:00-5:00 CDT Sat.
TECH SUPPORT
8:00-7:00 CDT Mon-Fri. /9:00-5:00 CDT Sat.
(708)291-7575

Credit Card charges are not submitted until time of shipment. Freight is calculated as the carrier's actual freight charge plus insurance and packaging material. The cost of insurance is 0.30% (0.0030) of the order total. Packaging materials will not exceed $4.00 per 1 package order or $6.00 per multi-package shipment. For your protection we ship only to your verified billing address. Non-defective returns subject to restocking fee. Allow 10 business days for shipping when paying by personal check. Software, chips and other electronic components are not returnable. All pricing subject to change. ™ - Trademarks of all companies listed in this ad.

WOR359

WE SELL NAME BRAND ITEMS FOR LESS!

(800)-359-4CDW

FAX (708) 291-1737

NASDAQ
CDW® is a NASDAQ traded company
TICKER SYM80L CDWC
D & B Rated 3A1 Duns 10-762-7952

©1993 CDW® Computer Centers, Inc.

Turn the Page For More CDW® Savings.

No Surcharge For Credit Cards

High Volume Bids Invited

COMPUTER DISCOUNT WAREHOUSE™

COMPUTER DISCOUNT WAREHOUSE™

COMPUTER DISCOUNT WAREHOUSE™

COLORADO MEMORY SYSTEMS

Colorado Jumbo 120 & 250

✓ Plugs Into Floppy Controller and Auto Selects Fastest Available Data Transfer Rate, Compatbile with All Internal and External Kits, Novell Netware 286/386, 3Com, and PC Net Compatible ✓ Up to 4MB/Min. on Jumbo 250 and Up to 2MB/Min. on Jumbo 120 ✓ Optional Controllers Available to Increase Speed 50% to 300%. Ask Your Salesperson for Details

Jumbo 120..... ONLY **$148.37** CDW 15160

Jumbo 250..... ONLY **$199.32** CDW 17886

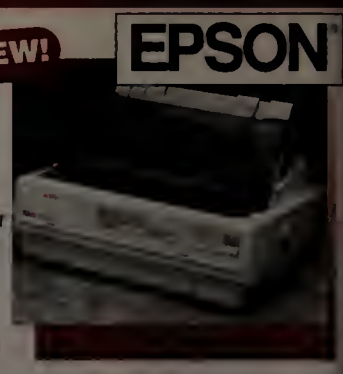
WHY PAY RETAIL?

CDW® Sells For Less

And Services You Better!

EPSON LQ570+ Printer

NEW! EPSON



✓ Includes Four Scalable Fonts, 8 to 32 Points ✓ Top, Rear, Bottom and Front Paper Paths ✓ Fast Print Speeds Up to 337 CPS ✓ Prints 3-Part Forms ✓ 14 Built-In Fonts ✓ Epson's 2-Year Limited Warranty

ONLY CDW® Price..... **$238.95** CDW 28765

HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

NETWORKING PRODUCTS

NOVELL

Netware V4.0

5 User CD's	889.00	100 User CD's	5599.00
10 User CD's	2038.00	250 User CD's	9997.00
25 User CD's	2094.00	500 User CD's	16833.00
50 User CD's	3999.00	1000 User CD's	30607.00

Netware V3.11

5 User 3.5"/	552.17	50 User 3.5"	2502.17
10 User 3.5"	1252.17	100 User 3.5"	3499.96
20 User 3.5"	1752.17		

SFT III V3.11

5 User/	1713.33	50 User	4951.66
10 User	2639.34	100 User	6933.63
20 User	3498.20	250 User	12549.24

Netware V2.2

5-User 3.5"	469.50	50 User 3.5"	1999.78
10 User 3.5"	999.73	100 User 3.5"	2688.57

Lite Win or DOS 69.00
Lite Starter Kits 399.77
Lite Add-On Kit 199.65
ETHERNET Interface Connector (NE1000) 129.44
ETHERNET Board (NE2000) 136.06
ETHERNET Eisa (NE3200) 687.50

THOMAS-CONRAD

5043T 10BT Ethernet, ...122.96
5046T 10BT PS/2 Ethernet 289.14
5055 8 Port 10BT Concentrator 349.58
4 Port Passive Hub 39.88
4035 4MBPS Toke Ring Adapter 288.49
6242TP+ 8Bit TP Arcnet 98.45
6245 16-Bit Arcnet, Coax, TP, TP+ 176.47
6242 Arcnet 8-Bit 66.20
6246 PS/2 Board Arcnet 209.16
6151-11 16 Port Smart Hub 709.01
6151 16 Port Arcnet Smart Hub 738.86
4045 16/4 Token Ring XT/AT 359.23
8Port Twisted Pair Active Hub 349.50
100MBPS TCNS EISA Fiber Optict 969.18
100 MBPS TCNS Smart Hub 6 Coax 1396.20
100 MBPS TCNS 16 Bit Twisted Pair 719.22
100 MBPS3047CX TCNS 32bit EISA Coax Adapt. 625.58

ARTISOFT

AE1/T 10 Base T Adapter, 8-Bit ARS-190 ....109.52
AE2 Ethernet Remote Boot ROM 46.88
AE3 Ethernet Adaptor 219.26
Etherbasket AE3 12pk 2189.55
Noderunner 2000/A 217.07
Noderunner 2000/T 179.18
Noderunner 2000/T 6pk 948.15
Noderunner 2000/T 12pk 1819.50
Noderunner 2000/M/TC 249.44
NOS AI Software V5.0 ....66.50
NOS AI 12 User 621.07
E143 Ethernet Adapter Kit 184.79
LANtastic Ethernet Starter Kit 443.31

SMC®

3402TP Transceiver AUI/TP 105.62
3402F Transceiver AUI/Fiber 339.70
3402 TransceiverAUI/BNC 134.60
Arcnet Passive Hub 69.88
Intelligent 8 Port Coax 399.99
Ethernet 16 Bit Combo 6 Pack 788.88
Ethercard Plus Elite 16E 6 Pack 689.09
PS/2 Arcnet 310 Board 138.79
10BT EISA BusMaster 2 Channel 609.55
3512 TP 12 Node Concentrator 599.18
Active Hub 8 Port Coax 229.88
Active Hub 8 Port Twisted Pair 345.68
3008 Coax 8-Bit Ethernet 87.82
3008 TP 10 BaseT 8-Bit Ethernet 99.53
3016 TP 10 BaseT 16-Bit Ethernet 125.50
PC 600FS Coax Arcnet File Server 16-Bit 199.00
PC 650WS TP Arcnet Workstation 16-Bit 119.88
PC 650FS TP Arcnet File Server 16-Bit 199.25

NETWORKING PRODUCTS

PC 600WS Coax Arcnet Workstation 16-Bit 119.88
PC130 8-Bit Arcnet Coax 68.50
PC130E 8-Bit Arcnet Coax 99.00
PC270 TP Arcnet 109.33
Eisa 3200 Arcnet Twisted Pair 736.08
8-Bit 10 Base T Ethernet Elite 119.48
Ethernet Plus/A PS/2 Coax Elite 189.10
16-Bit Ethernet Plus Coax Elite 119.50
8-Bit Ethernet Plus Coax Elite 99.29
Combo Ethernet TP, Coax, AUI Elite 153.57
10 Basket Elite PS/2 ....205.10
SMC Token Card Elite 16/4 ....339.65

3Com®

3C503 TP 10 Base T 223.88
3C503-16 Etherlink II 16 bit 163.84
3C507 Ethernet Card 279.61
3C503 Etherlink 188.24
3C509 TP Etherlink III 133.25
3C619 Tokenlink III 4/16 10pk 3999.43
Ethernet Repeater 829.03

Xircom

PCMCIA Ethernet 10 BT 274.52
Ext. Ethernet LAN Adapter-RJ45AUI/BNC 393.92
PE210 BX LAN Ethernet II/Thick 285.98
PE310 BC Pocket Ethernet Coax/TP 309.16
PE310 B2 Pocket Ethernet Coax 275.56
PT216B3 16/4 Token Ring DB9 ....527.03
Arcnet Pocket Adaptor Coax/RJ45 ....239.50/234.77
Ethernet Pocket Adaptor Thin Coax/10BT 299.55/329.55
Ethernet Pocket Print Server 242.50
Parallel Port Multi 72.00
PT216BT Token Ring Pocket Adaptor 539.23

TAPE, REMOVABLE & FLOPPY DRIVES

COLORADO MEMORY SYSTEMS INC.

COLORADO 2GB SCSI Power Tape 1129.09
COLORADO 4GB SCSI Power Tape 1529.10
COLORADO Jumbo 120 ....148.37
COLORADO Jumbo 250 ....199.32
COLORADO Trakker 120MB Portable Back-up .288.00
COLORADO Trakker 250MB Portable Back-up .408.21

Call For Accessories And Interfaces

I-MEGA

21 MB Floptical Insider Diskette Drive 349.00
21 MB Floptical Ext Diskette Drive 389.10
Tape 250, 250MB Tape Back-up 196.10
Bernoulli PC Powered 90/Pro 489.25/ 629.57
Bernoulli Transportable 90 Pro 639.81
Bernoulli Transportable 150 Pro 859.25
Bernoulli Insider 90 Pro 549.47
PC Powered Multidisk 150 ....795.15

SUMMIT

SUMMIT 120MB Int 3.5 MB/ min. 139.99
SUMMIT 250MB Int 4 MB/ min. 199.34
SUMMIT 305MB, Internal IDE 10MB/min. 259.90

MICROSOLUTIONS

External 100MB HD 497.06
External 200MB Portable HD 582.95
Backpack External Floppy 3.5" or 5.25" 189.41
Backpack CD ROM 359.12
External 80-250MB Tape Backup 379.30

Mountain.

TD250 Internal Tape Backup 219.50
250MB Internal Backup 474.42
304MB Internal IDE Backup 439.50
250MB External Backup 1179.22
2.0 Gigabyte External Filesafe 1976.40
4.0 Gigabyte, Int. 4mm DAT 1797.00
Sidecar 305MB Portable Tape Backup 515.21

Call For PS/2 Drives, Controllers, Accessory

IRWIN

A CONNER PERIPHERALS Company

120 MB External EZ Port 379.25
250 MB External EZ Port 389.25
A120PC-120 MB Internal 175.19
A250PC-250 MB Internal 199.89
A120E-120 MB High Speed External 289.13
A250E-250 MB High Speed External 319.68

Call For Controllers, Accessory Kits and Tapes

NETWORKING PRODUCTS

IBM TOKEN RING

IBM 16/4 PS/2 MCA 609.11
IBM 16/4 XT/AT 498.27
IBM 16/4 Multi Access Unit MAU 432.26

INTEL NETWORKING

INTEL Token Express EISA 16/4 ....599.88
INTEL Ether Express 16-Bit Coax 99.53
INTEL Ether Express 16-Bit TP 99.33
INTEL Token Express XT/AT 16/4 ....399.23
INTEL Ether Express EISA 32-Bit 397.30
INTEL Ether Express 16bit TP 5 pk 499.43

BORLAND dBase IV LAN Pak 626.37
BORLAND Quattro Pro Network Node 244.30
CC Mail Products ....CALL
HARVARD GRAPHICS LAN Pack ....CALL
LOTUS 1-2-3, 2.4 Server / Node 558.66/ 339.47
LOTUS 1-2-3, 3.4 Server / Node 459.18/ 99.50
MICROSOFT Word 5.5 Network Node 185.39
MICROSOFT Excel Network Nodes 249.11
WORD PERFECT Office 5-User V.3.01 ....278.79
WORD PERFECT Office 20PK V.3.01 ....923.08

WYSE TERMINALS

WYSE 50 Amber or Green 349.15
WYSE 60 Amber or Green 279.92
WYSE 160/30 Amber or Green 327.98/274.89
WYSE 185 VT320 Amber, Green or White 327.60
WYSE 150 Amber, Green or White 265.45
WYSE 325 Color/ 325ES Low Emission ....519.40 / 549.39

MULTIMEDIA, SOUND, CD's, FAX

Advanced Digital Systems PC PrimeTime 389.14
Advanced Digital Systems VGA to TV Elite 267.21
Advanced Digital Systems Video Clipper 359.11
ALTEC ASC300 Speakers w/ Sub Woofer 287.50
ALTEC ASC150 Powered Sub Woofer 109.46
ALTEC Speakers ACS100 ....126.93
ARISTASOFT, Wired for Sound 39.49
ATI Multimedia Upgrade Kit 489.26
CD-ROM Software 5 CD's Bundle, Call For Titles 129.18
COMPLETE PC Communicator Data, Fax, V Mail 119.56
COREL SYSTEMS Artshow 179.25
COREL SYSTEMS Draw CD 3.0 ....419.29
CREATIVE LABS Int. CD-ROM Upg Kit 388.33
CREATIVE LABS Sound Blaster 76.93
CREATIVE LABS Sound Blaster Deluxe 129.18
CREATIVE LABS Sound Blaster Pro MC 258.81
CREATIVE LABS Sound Blaster Pro 16 Bit 199.23
CREATIVE LABS Sound Blaster Professional .179.28
CREATIVE LABS MultiMedia Starter Kit 449.82
CREATIVE LABS MultiMedia Int.Upgrade Kit ..485.82
CREATIVE LABS Video Blaster 309.46
CREATIVE LABS Video Blaster Windows 338.29
HP Plain PaperFax 200/310 ....968/1269.10
INTEL Smart Video Recorder 497.64
LOGITECH SoundMan 148.83
MediaVision DoubleFusion CD 16 Bit 619.09
MediaVision Pro 16 System II Bundle 898.08
MICROSOFT Beethoven's 9th For Windows CD .49.50
MICROSOFT Bookshelf For Windows 119.20
MICROSOFT Multimedia Dev. Kit Windows 309.40
MICROSOFT Windows Sound System 179.83
MICROSOFT Works For Windows CD 119.20
ORCHID Sound Producer 109.43
PRACTICAL PERIPHERALS FAX ME 175.50
SIRIUS Publishing PC KARAOKE 89.26
TURTLE BEACH 16 Bit Multibundle 668.15
TURTLE BEACH MultiSound 519.24
TURTLE BEACH Wave for Windows 75.07

CD-ROM & OPTICAL DRIVES

HITACHI 3700 ....409.30
HITACHI 1700SA External 467.42
MAGNAVOX Int MPC CD ROM 329.00
NEC CDR 38 External Portable 379.40
NEC CDR 74-1 External 589.36
NEC CDR 74 Multi-Media Bundle 819.32
NEC CDR 84-1 Internal 529.91
PANASONIC LF5010 Worm External 2199.91
PANASONIC LF7010 Ext. 1 Gb Erasable Optical ..2599.20
Procom Tech 200MS Int. Photo CD Compact ..444.32
Procom Tech 200MS Ext. Photo CD Compact 548.60

CD-ROM & OPTICAL DRIVES

SONY CDU-31A Internal 550MS, MPC 233.00
SONY CDU-535 Internal 340MS 279.00
SONY CDU-541 Internal 380MS, SCSI, MPC 418.00
SONY CDU-6211 External 380MS, SCSI MPC 534.00
SONY CDU-7205N External 340MS 453.00
SONY CDU-7211 External 380MS, SCSI MPC 534.00
SONY SMO-S501 650M6 Erasable Optical 2595.42
TEXEL CD ROM Int 265 ms/ Complete Kit 439.27
TEXEL CD ROM Ext 265 ms/ Complete Kit 515.08
TEXEL Ext 265 ms/ Business Bundle Multi-Media 995.77
TEXEL Int 265 ms/ Business Bundle Multi-Media 893.21
TEXEL Int 265 ms/ Consumer Bundle 2, Multi-Media 588.77

PLOTTERS, DIGITIZERS & SCANNERS

KURTA

KURTA 12 x 12 XGT pressure sensitive 399.12
KURTA 12 x 12 XLP/12 x 18 XLP 199.50/ 489.29
KURTA 12 x 17 ....538.27

CalComp

CALCOMP 12 x 12 w/16 But. 279.92
CALCOMP 12 x 18 w/16 But. 559.77
CALCOMP 2024/2036 Pacesetter ....CALL
CALCOMP Classic 4036 ....CALL
CALCOMP Design Mate 3024 ....CALL

Summagraphics

Summagraphics Summa III 12 x 12 ....253.60
Summagraphics Summa III 12 x 18 ....519.60
Summa Grid III 18 x 24 ....1083.33
Larger sizes ....CALL

HOUSTON INSTRUMENT

HOUSTON INSTRUMENTS DMP-61 ....2075.00
HOUSTON INSTRUMENTS DMP-161 ....2619.49
HOUSTON INSTRUMENTS DMP-162 ....3619.51

HEWLETT PACKARD

HP7475A/HP7550B ....1309.25 / 3009.70
DESIGNJET 600 A-D/ 600 A-E 5498.35/ 6956.30
DRAFT PRO PLUS A-E Size/ A-D .4247.19/ 3168.54
SCANJET IIP w/ INT. 724.10/2529.36
SCANJET II C Color XT/AT w/ INT. 1299.10

EPSON ES600C Color SCSI Scanner 837.99
EPSON ES800C Color SCSI Scanner 1088.40

VIDEO PRODUCTS

VGA & SUPER VGA MONITORS

AST 14" Color VGA 1024 x 768 .28mm 399.15
MAGNAVOX Super VGA .28mm CM2089 ....279.00
MAGNAVOX 7BM749 Mono 14" VGA 109.50
MAGNAVOX 17" CM9217, .31mm 749.58
MAGNAVOX 20 CM64, 20 Inch 1164.00
MAG Innovision MX15F 15" 1280 x 1024 ....619.26
MAG Innovision MX17F 17" 1280 x 1024 ....1088.50
MAG Innovision MPCIF 21" 2398.12
NANAO 17" 1280 x 1024 .28 mm FST 1109.39
NANAO F760IW 21" (Energ Star) 2089.19
NEC Multisync 3FGE/4FGE ....599.90 / 709.43
NEC Multisync 5FGE/6FG ....1085.37 /2298.57
NEC Multisync 2A 298.00
NEC SVGA 14", 1024 x 768 .28mm 389.55
PANASONIC C1381i, 1024 x 768, 14" 325.76
PHILIPS 1436, 14", 1024 x 768 ....379.86
PHILIPS 1557, 15", 1024 x 768, .28 ....499.58
SEIKO CM1760CR 944.15
SONY 1430 14" 1024 .25mm Digital 599.95
SONY 1730/SONY 2030 ....999.42/CALL

VGA & SUPER VGA DISPLAY CARDS

ACTIX Graphics Engine 32 VL 2 MB 199.07
ACTIX Graphics Engine Ultra 299.31
ATI GRAPHICS ULTRA 1MB 209.23
ATI GRAPHICS ULTRA Pro EISA 2 MB 394.92
ATI GRAPHICS ULTRA +2 MB 239.55
ATI GRAPHICS ULTRA Pro 2 MB 357.62
ATI GRAPHICS ULTRA Pro MCA 2 MB 394.92
ATI GRAPHICS VANTAGE 1MB 179.41
ATI VGAWonder XL24 1 MB 119.32
ATI VGAWonder GT 163.73
DIAMOND Speedstar Pro / Local Bus 136.64/ 142.28
DIAMOND Speedstar Stealth VESA Local 159.99
DIAMOND Speedstar 24X 1 MB 157.50
DIAMOND Viper w/2MB 414.21
HERCULES Graphite 219.26
HERCULES Dynamite VL 165.38
ORCHID Prodesigner IIS 1 MB 145.45
ORCHID Farenheit 1280 Plus, 1MB 159.17
ORCHID Farenheit VA 1MB 1280 x 1024 ....199.32
VIDEO 7 Win Dot Pro/ VGA 16 ....149.57/ 89.41
VIDEO 7 Win VGA 1MB 96.74

IF YOU FIND A BETTER PRICE CALL CDW® BEFORE YOU BUY

(800) 359-4CDW

NASDAQ

CDW® IS A NASDAQ TRADED COMPANY
TICKER SYMBOL CDWC
D & B Rated 3A1
Duns 10-762-7952

No Surcharge For Credit Cards

VISA DISCOVER MasterCard CDW

Credit Card charges are not submitted until time of shipment. Freight is calculated as the carrier's actual freight charge plus insurance and packaging material. The cost of insurance is 0.30% (0.0030) of the order total. Packaging materials will not exceed $4.00 per 1 package order or $6.00 per multi-package shipment. For your protection we ship only to your verified billing address. Non-defective returns subject to restocking fee. Allow 10 business days for shipping when paying by personal check. Software, chips and other electronic components are not returnable. All pricing subject to change. ™ Trademarks of all companies listed in the ad.

CDW® HOURS

Sales 7:30-7:30 CDT Mon-Fri.
9:00-5:00 CDT Sat.
Tech Support for Customers
8:00-7:00 CDT Mon-Fri.
9:00-5:00 CDT Sat.

MOST ORDERS SHIP THE SAME DAY

COMPUTER DISCOUNT WAREHOUSE™

US Robotics Sportster 14400 w/Fax!

HOT!

✓ CCITT Asynchronous, Full-Duplex Communications from 14,400 to 300 bps: -CCITT V.32 bis at 14,400/12,000 bps-Additional CCITT and Bell Compatiblity with 2400/1200/300 Dial-Up Modems-CCITT V.25 for Calls Originating Outside the U.S. and Canada ✓ 14,400 V.17 Send and Receive FAX with FAX Software ✓ Error Control (Both CCITT V.42 & MNP 2-4) ✓ Data Compression (Both CCITT V.42 & MNP 5 for Throughput Up to 57,600 bps

CDW® Price ..... ONLY **$197.28** CDW 28092

WHY SETTLE FOR LESS?

CDW® SERVICES YOU BETTER

American Power Conversion

Protect Your Business Data and Creative Work From the Inevitable and Unpredictable Disruptions Which Occur on the AC Power Utility Line. The UPS Provides Your Desktop Computer, File Server, or Workstation With Protection From all Forms of Power Line Trash Including Blackouts, Brownouts, Surges, Spikes, Noise and Sags. CDW® Carries the Full Line of American Power Backups, Line Conditioners and Surge Protectors

BACK UPS 250 ..... ONLY **$98.25** CDW 20662
BACK UPS 400 ..... **$157.25** CDW 13124

CDW® CARRIES OVER 15,000 PRODUCTS. IF YOU DON'T SEE IT, CALL!

COMPUTERS

TOSHIBA

T1900/80 .....1588.93
T1900/120.....1709.85
T1900C/120 .....2336.44
T1900/200.....1959.68
T1900C/200 .....2586.27
T4500/80.....1793.62
T4500/120.....1989.98
T4500C/120.....3189.32
T4500/200.....2289.44
T4500C/200.....3074.10
T4600/120.....2749.83
T4600/200.....2999.99
T4600C/120.....3918.73
T4600C/200.....4168.57
T4600C/340.....4584.96
T6400/200, GP.....3499.12
T6400C/200.....5459.23

AST

Bravo 3/33 / 4/25S 4MB 120HD 969.28/1049.10
Bravo 4/33 / 4/66d 4MB 120HD 1377.12/1879.31
Bravo 4/50d, 2MB, VGA, DDS 1587.85
Bravo LP 4/33, 4MB, 170HD 1429.28
Bravo LP 4/33, 8MB, 340HD 1849.13
Bravo LP 4/25, 4MB, 170HD.....1176.27
Bravo LP 4/66, 8MB, 170HD.....1924.59
PDWEREXEC EL 3/25 120HD 1768.42
POWEREXEC EL 3/25 Color No HD 1815.43
PDWEREXEC 3/25SL 4MB, 160HD, Color 2947.92
PDWEREXEC 3/25SL 4MB, 120HD 1936.43
POWEREXEC 3/25SL Active Color, 200HD 3354.84
PDWEREXEC 486/25SL Mono 1515.00
Premmia 4/33SX/4/33D 8MB 170HD ..2099.29/2479.41
Premmia 4/50D/4/66D 8MB 340HD 2898.53/3198.50
SE 4/33 EISA Server 8MB,1 Floppy 2528.39
SE 4/50 EISA Server 18MB,1 Floppy 3224.04

Canon

Notejet 4/25 1B0 HD Notebook w/ built in ptr .2774.65
Notejet 4/25, 135HD Notebook w/ built in ptr..2554.59
Notejet 4/25, B5HD Notebook w/ built in ptr..2325.21
INNOVA 486DX/33 Desktop 4 MB 210HD 1438.14
INNOVA 4B6DX/66 Desktop 4 MB 245HD 1929.32
INNOVA 386SX/25 Notebook 4 MB 120HD FX Modem.1549.00

DTK Gràfika

486/33 DX, Tower, No HD, 8MB, VGA, 2 Flop/200HD 1194.23 / 1592.41
486/33 DX, No HD, 8MB, VGA, 2 Flop/200HD..1165.68 / 1557.95
486/66 DX2, Tower, 200HD, 8MB, 2 Flop, DOS, Win.....2346.59

NEC

Image II 4/66, 4MB, 170 HD 2099.44
Image II 4/66, 4MB, 340 HD 2338.80
NEC Ready 486SX/25, 4 MB, 170 MB, 2 Floppies 1179.62
NEC Ready 4860X/33, 4 MB, 170 MB, 2 Floppies 1479.29
NEC Ready 4860X2/66, 8 MB, 240 HD, 2 Floppies 1999.27
Versa 4B6/25 4MB, 120 HD 2679.39
Versa 486/25C Color 4MB, 180 HD 3928.22
Versa 4B6/20C Color 4MB, 120 HD 3579.16

Texas Instruments

486 WIN SX25, 120HD, 4 MB VGA, ...1878.48
486 WIN DX2/50, 200HD 2978.78
486 WIN DX2/50, Active Color 200HD 4276.20
486 WIN DX25, 200HD, 4MB, VGA 3069.15
486 WIN DX2/40 color, 200HD 3578.12

DOT MATRIX & LASER PRINTERS

OKIDATA

OL400E.....CALL

ML184 Turbo 215.33
ML320 .....299.12
ML321 .....417.08
ML380 .....209.00
ML393+ 919.20
ML393 + Color.....959.50
ML395 .....966.97
ML395 + Color...1019.74
ML520 .....369.11
ML521 .....488.11
ML590 .....419.20
ML591 .....589.52
OL810 .....909.15
OL840 .....1069.12
OL850 .....1239.66

*After Mfr.'s $50 End-User Rebate. Ends 7/31/93

Canon

BJ230 Bubble Jet Wide Carrage.....399.98
BJ10EX Bubble Jet 248.40
BJ200 Bubble Jet.....229.12

EPSON

AP2250.....113.30
AP3250.....173.15
Action Laser 1500 .659.89
DFX 5000 .....1309.12
DFXB000 ..... 2138.95
FXB70.....263.10
FX1170.....348.22
EPL 8000 Laser...818.13
LO570 Plus 238.95
LOB70 .....428.15
LO1070.....348.50
LO1170.....588.20
LO2550 .....868.44
LXB10.....168.95
Stylus 800 .....*299.00

*After Rebate

NEC

Silentwriter II 95F.....885.33
Silentwriter II 97 1059.29
P3200 24-pin.....219.88
P3300 24-pin.....322.58
P6200 24-pin.....399.92
P6300.....599.50
P9300.....869.21

DOT MATRIX & LASER PRINTERS

Panasonic

1624 .....328.93
1654 .....523.86
2023I 198.97
2123 .....229.09
2124 .....298.95
2180.....158.92
2624.....358.48
4410 Laser 598.00
4430 Laser.....658.95
4450I Laser.....958.12

Texas Instruments

TI microWriter Basic 5PPM.....619.35
TI microWriter PS23 /PS65 .....869.19 / 1099.57
TI microLaser TurboPlus PS 9PPM RISC.....1378.55
TI microMarc Ink Jet.....368.92

Hewlett Packard

Deskjet 500.....359.50
Deskjet 500C.....509.39
Deskjet 550C.....695.11
Deskjet 1200C.....1419.12
LaserJet 4.....1399.46
LaserJet 4L.....689.10
Laser 4SI.....3229.78
Paintjet.....577.00
Paintjet 300XL. 2259.18

CPI JETMEMORY 1MB for HP IIP/III/IIID 75.60
CPI JETPAGE for HP IIP/IID/III Postscript.....184.40
Dataproducts 960 RISC PS 9PPM 999.95
Dataproducts 965 RISC PS 9PPM 1694.15
KODAK Diconix 701/ Parallel .....316.40 / 229.22
KODAK180 SI Parallel/180 SI Serial..209.28 / 229.22
PACIFIC DATA 25 in 1 Cart. LAS3.....245.00
PACIFIC DATA 1 MB for 2P III/IIID/IIIP.....79.46

HARD DRIVES & CONTROLLERS

Maxtor

7120A 130MB IDE 15MS, 3.5", HH 206.78
7213A, 213MB, 15MS, 3.5" HH, IDE 259.95
7213S 212MB, 15MS, 3.5" HH, SCSI 297.40
7345A 340MB, 13MS, 3.5" HH, SCSI-2.....496.55
LXT535S 535MB, 13MS, 3.5" HH,SCSI.....959.06
PO-12S1029MB,13MS, 3.5" FH, SCCI-2 .....1229.84
P1-17S1503MB,13MS, 3.5" FH, SCCI-2 .....1488.12
1240S 1240MB, 8.5MS, SCSI-2 .....1694.40

MICROPOLIS

MCP152B-15 1345MB SCSI 999.42
MCP2105 560MB, 10MS 3.5" HH, SCSI.....1089.93
MCP1624 668MB, 16MS 5.25" FH, SCSI. 1174.64
MCP2112 1000MB, 10MS 3.5" HH, SCSI-2...1288.22
MCP2112A 1000MB, 10MS 3.5" HH, IDE.....1569.59
MCP1548 206MB, 14MS 5.25" FH, SCSI. 1966.94
MCP1924 2070MB,14MS 5.25" FH, SCSI-2..2419.88

CONNER

CP3000 40 MB, 28MS, 3.5" HH, IDE 149.34
CP30064H 64MB, 19MS, 3.5" HH, IDE.....179.82
CP30104H 120 MB, 19MS, 3.5" HH, IDE..... 194.17
CP30084E 84 MB, 19MS, 3.5" HH, IDE.....189.76
CP301074E 174MB, 17MS, 3.5" HH, IDE.....219.58
CP30204 212 MB, 12MS, 3.5" HH, IDE. 339.63
CP30254 251MB, 14MS, 3.5" 1", IDE 376.88
CP3364 360MB, 12MS, 3.5" HH, IDE 789.83
CP30544 540MB, 10MS, IDE.....897.14
CP30540 540MB, 10MS, 3.5" HH, Fast SCSI-2.959.27
CP31370 1371MB, 10MS, 3.5" HH, SCSI-2...1892.00

Quantum

PLUS Hardcard IIXL 50 MB/ 105MB ..203.70/ 259.20
PLUS Hardcard EZ 240MB /127MB . 539.45/ 319.14
PRO DRIVE 240MB IDE 299.73
PRO DRIVE 1GB SCSI-2 ..... 1289.15
PRO DRIVE 525MB IDE 10MS 3.5" 749.14

Seagate

ST351/AX 42MB. 28 MS 1", IDE.....129.82
ST3120A 106MB, 19MS, 3.5" HH, IDE 189.94
ST3144A 130MB, IDE, 16MS.....219.51
ST2511 40 MB. 28 MS, 5.25" MFM.....259.41
ST3243A 200MB, IDE,12MS, 3.5" HH, IDE.....366.40
ST1239A 211MB, IDE, 3.5" HH.....439.94
ST1480A 426 MB IDE, 3.5" HH.....819.37
ST2383A 338MB,16MS, 5.25" HH, IDE.....669.27
ST3290A 216MB, IDE, 3.5".....315.69
ST3385A 340MB, IDE, 3.5".....387.48
ST3600A 525MB, IDE, 3.5".....859.05
ST4766E 766MB,16MS, 5.25" HH, ESDI.....1059.80
ST41200N 1050MB.....1074.29

CONTROLLERS

Acculogic IDE 3 Plus 16 BIT.....39.90
Acculogic IDE 3 16 BIT Controller 23.10
Acculogic IDE 4 14/15/16 Controller.....29.87
Adaptec 1542C Kit 257.43
Adaptec 1522K Kit 16 Bit SCSI Host Adaptor 145.45
Adaptec 1742K Kit 32 Bit EISA Kit.....439.61
Ultrastor 34F Local Bus SCSI Controller.....298.24
Ultrastor 12F ESDI/Floppy Controller 166.86
Ultrastor 24F EISA SCSI Controller 399.85

MODEMS & COMMUNICATIONS

US Robotics

14.4 Sportster Ext..179.50
14.4 Sportster Fax.197.28
14.4 Sportster Int...157.48
14.4 Sportster Fax.179.50
9600 Sportster Ext.155.53
9600 Sportster Fax169.90
9600 Sportster Int..147.50
9600 Sportster Fax164.81
16.6 & 14.4 Courier Dual Std. Ext/ Fax....673.91/ 688.44
18.8 HST Courier External/ Fax.....484.49/ CALL
14.4 Courier External/ Fax.. .....359.10/ 388.31
14.4 Courier Internal.....328.00
Worldport 9696 Portable/w/Fax.....263.87/278.73
Worldport 14.4 Portable/ Fax 303.11/ 339.48
LAN Modem V.32 BIS Ethernet.....1096.57
NEW! 14.4 PCMCIA Fax.. .....459.00

Hayes

ACCURA 144FAX. 219.46
ACCURA 144BFAX.197.88
ACCURA 96FAX... 199.66
ACCURA 96BFAX. 177.12
ACCURA 2400B.....59.10
ACCURA2400..... 69.25
OPTIMA 14.4..... 363.56
OPTIMA 14.4 Fax 368.49
OPTIMA 9600.....339.50
OPTIMA 9600 Fax 349.20
OPTIMA 2400 .....112.34
OPTIMA 2400 Fax 119.34
ULTRA 9600 .....559.98
Pocket 2400 .....89.92

Practical Peripherals

14.4 V.32 BIS, Snd/Rcv FAX Internal.....186.52
14.4 Fax Mini Tower.....197.28
14.4 Fax Pocket 338.98
9600 Fax Mini Tower.....183.21
Fax Me Rcv Fax cartridge for HP Laser II/ III ...168.92

intel

SatisFAXtion 100..... 95.50
SatisFAXtion 300..... 228.09
SatisFAXtion 350..... 299.65
SatisFAXtion 400..... 368.95
SatisFAXtion 400E...374.95
14.4 Fax Int.....169.81
14.4 Fax Ext.....199.28
96 Fax Int.....156.07
96 Fax Ext.....167.89

MULTI-TECH

MULTI-TECH 224BA 2400 EXT.....239.50
MULTI-TECH 932BA 9600 EXT 406.62
MULTI-TECH 1432BA 14.4 EXT w/FAX 436.11
MULTI-TECH 1432BL 14.4 EXT 489.41

MATH COPROCESSORS

INTEL 387DX 16/20/25/33 .....78.99
INTEL 3B7SX 16/20/25 / 387SX 33 .....74.95 / 88.68
INTEL 2B7XLT 78.00
INTEL Rapid CAD For All 3B6 DX's 239.10

BATTERY BACKUP AND UPS

Tripp Lite

BC-250 .....99.30
BC-400 .....155.10
BC-500 .....179.55
BC-500 LAN 189.77
BC-600 LAN 248.13
BC-900 LAN 348.51
BC-1250 LAN 479.27
Isobar 4 .....38.95
Isobar Ultra 4 .....42.75
OMNI 450 LAN 279.17
OMNI 600 LAN 378.90
OMNI 900 LAN 499.50
OMNI 1250 LAN 629.26
Isotel Ultra 6 .....57.13
Isobar 6.....46.38
Isobar Ultra 6 .....48.75
Command Console...58.45
LapPwr DC/AC..... 59.50

AMERICAN POWER

BACK UPS 250.....98.25
BACK UPS 400....157.25
BACK UPS 450....188.68
BACK UPS 600....262.84
BACK UPS 900....379.88
BACK UPS 1250..490.68
Surge Arrest 7.....19.42
Surge Arrest Plus 7..37.97
Surge Arrest 7 Tel 49.88
Smart 400.....321.60
Smart 800.....399.10
Smart 900.....597.55
Smart1250.....797.87
Smart 2000.....1242.60
Line-R 600.....125.09
Line-R 1250.....175.58

MICE

LOGITECH Dexxa Serial Mouse.....29.50
LOGITECH Fotoman Plus.....539.30
LOGITECH Mouseman Cordless.....79.33
LOGITECH ScanMan 32/Scanman 256 ....99.55 / 169.25
LOGITECH SerialTrackmanII/Portable.....74.99 / 95.50
MEMOREX 3 Button Mouse Plus 29.50
MICROSOFT Mouse V2.0 Bus 5 Pack 329.32
MICROSOFT Mouse V2.0 Bus No Software.....88.80
MICROSOFT Ball Point Mouse.....109.50
MICROSOFT Serial Mouse, V2.0 No Software. 79.80

KINGSTON MEMORY

AT&T CREDIT CARD 4MB 199.00
EPSON EPL 7000 512K.....35.90
EPSON ACTION LASER 2-8MB.....109.53
AST BRAVO 486LC 2MB 115.96
AST PREMIUM II 1MB CUPID SIMM 57.43
AST POWEREXEC 486 4MB.....207.29
AST PREMIUM 386SX 2MB 99.08
AST PREMIUM 4MB 169.60
AST PREMIUM EXEC 4MB 149.75
AST PREMMIA 16MB 649.29
AST PREMMIA 8MB UPG 329.91
AST PREMIUM 486/33 8MB 349.66
AST BRAVO 386SX 8MB.....355.43
APPLE MAC LCIII 4MB.....169.60
APPLE MAC LCIII 16MB 614.82
COMPAQ PROSIGNIA 16MB.....1005.00
COMPAQ DP388/33 2MB 125.63
COMPAQ 386N 2MB 99.08
CPQ LITE 4/25C 16MB 819.74
COMPAQ LITE 4/25C 4MB/ 8MB 179.16/ 329.91
COMPAQ DP 386/33L 32MB 1417.65
COMPAQ PROSIGNIA 32MB.....2005.88
COMPAQ DP 386/18 4MB 337.05
COMPAQ DP286N;386N 4MB.....169.60
COMPAQ DP386/20E&25E 4MB.....244.98
COMPAQ DP386SX/16 4MB 244.98
COMPAQ DP 386/20E 4MB.....209.50
COMPAQ DP386SX/16 4MB 209.50
COMPAQ CONTURA 4B6 16MB 819.74
COMPAQ CONTURA 4B6 8MB 355.43
COMPAQ PORTABLE III 2MB 244.98
COMPAQ 8MB DP 4B6/33M.....355.43
COMPAQ B SOCKET EXP W/8MB.....514.33
COMPAQ CONTURA 4MB 169.60
COMPAQ CONTURA 3/20 8MB 349.30
COMPAQ LITE 4MB CREDIT CARD.....188.44
KINGSTON CPQ DP 4/66I 512KB VIDEO RAM .85.96
COMPAQ PROLINEA 486/33 4MB.....175.00
COMPAQ PROLINEA 486/33 8MB.....359.56
COMPAQ PROLINEA 3/25S 2MB 99.08
DELL 310-2525 16MB.....699.51
DELL 320SX 4MB 169.60
HP LASERJET 2P/III 1MB 79.34
HP LASERJET II & IID 2MB.....129.91
HP LASERJET 2P/III 2MB 129.25
HP VECTRA 4B6 4MB 189.31
HP LASERJET II & IID 4MB.....209.56
HP LASER 4L 1MB MEM UPG 64.61
HP VECTRA 386/25 8MB 364.92
HP DESKJET 500 & 500C 256KB 57.43
HP LASERJET 3SI 4MB 169.60
HP LASERJET 4 2MB.....99.56
HP LASERJET 4 4MB/ 8MB 169.60/ 339.17
HP PAINTJET XL300 4MB/ 8MB 244.98/ 418.75
TI MICROLASER 1MB 64.61
TI TM 3000 2MB.....85.96
TI TM4000 4MB.....199.00
TI MICROLASER 4MB 199.00
TI WINSLC/25 2MB.....108.97
IBM PS/2 70 4MB.....337.05
IBM PS/2 90 4MB.....175.88
IBM PS/2 90/95 8MB.....369.89
IBM PS/2 70-E61 1MB 64.61
IBM MOD30 2MB 99.08
IBM PS/2 70-061 2MB.....97.90
IBM PS/2 70-A21 2MB 99.08
IBM PS/2 55SX 4MB 175.88
IBM PS/2 50 2MB.....199.00
IBM 55SX 4-16MB.....257.38
IBM 16MB.....685.76
IBM THINKPAD 700 4MB/ 8MB 199.00/ 418.75
IBM PS/1 2MB.....97.90
NEC VERSA 4MB/ 8MB 229.41/ 429.71
NEC PM 3B6/33 1MB.....67.91
NEC SILENTWRITER 95 2MB.....89.36
OKILASER 400 2MB 129.91
OKILASER 800 2MB 119.41
OKILASER 800 4MB 219.85
PANASONIC 4410, 4430 2-4MB.....119.41
PANASONIC P4450I 2MB 138.19
PANASONIC CF370 1MB.....67.91
SPARC II 16MB 685.76
TOSHIBA T1200XE 2MB 99.08
TOSHIBA 1800, 1850, 2000SX/E, 2200SX 2MB 99.08
TOSHIBA 1800 ,1850, 2000SX/E, 2200SX 4MB ..187.50
TOSHIBA T1800, 1850, 2000SX/E, 2200SX 8MB 339.17
TOSHIBA T3100E 2MB.....115.96
TOSHIBA T3200SX 2MB/ 4MB.....115.96/ 188.44
TOSHIBA 3300SL 2MB/ 4MB 115.96/ 188.44
TOSHIBA 4400, 4400SX/C 4MB.....199.00
TOSHIBA 1900C,4500C,4600C 8MB 429.71
TOSHIBA 5200 2MB 109.53
ZENITH 386SX/20 2MB 115.96

ACCELERATOR/OVERDRIVE

INTEL Overdrive 486/25DX / 486/33DX..444.66 / 549.55
INTEL Dverdrive 486/SX,25MHz /20 MHz .433.20 / 329.44
INTEL Overdrive 486/33SX.....549.49
KINGSTON SX Now, 25 MHz, IBM 50, 60, 50Z 169.20
KINGSTON 486SX Now, 25 MHz, Compaq.....399.72
KINGSTON 486DX Now, 33 MHz, Compaq 729.89

COMPUTER DISCOUNT WAREHOUSE™

FREE TECHNICAL SUPPORT FOR CDW® CUSTOMERS. (708) 291-7575

CDW® Sells for Less and Services You Better!

(800) 359-4CDW

FAX (708) 291-1737

©1993 CDW® Computer Centers, Inc. WOR359

CALL FOR FREE CDW® CATALOG

COMPUTER DISCOUNT WAREHOUSE™

WHY PAY RETAIL? CDW® Sells For Less !

COMPUTER DISCOUNT WAREHOUSE™

T4600 T4600/C
Replace Your Desktop!

PCMCIA

✓ 33 MHz i486SL Processor ✓ 4MB RAM Expandable to 20MB ✓ Monochrome Model "Super VGA" 9.5" TFT-LCD; Color Model: Active Matrix 9.5", 256 Colors from a Palette of 185,193 ✓ 120MB, 200MB, or 340MB Hard Drive ✓ **2 PCMCIA Slots** ✓ 1.44MB Diskette Drive ✓ Pre-Installed Software: MS-DOS®, Windows®, UltraFont™ Text Enhancer and Hypertext Disk-Resident Documentation ✓ Ball Point™ with QuickPort™ ✓ Weighs only 6.9 lbs.

120MB LCD/ Color ....**$2749.83/$3918.73** CDW 29539/ 29541

200MB LCD/ Color ..**$2999.99/$4168.57** CDW 29540/ 29542

340MB Color ..... **$4584.96** CDW 29543

TOSHIBA PERFORMANCE, **TOSHIBA** QUALITY, **TOSHIBA** VALUE!

T1900 T1900/C
486 Power at a Great Price!

PCMCIA

✓ 486SXA 20Mhz Processor with 3.3 Volt Circuitry ✓ 4MB RAM Expandable to 20MB ✓ Monochrome Model: 9.5" Monochrome VGA-LCD Display ✓ 64 Grayscales ✓ Color Model: 9.5" Dynamic - STN Display With Proprietory VIVIX™ Technology for Faster Response. ✓ **PCMCIA Expansion Slot** ✓ Pre-Installed Software: MS-DOS® 6.0, Windows® ✓ Ball Point™ with QuickPort™ ✓ External Monitor Port, Parallel Port, Serial Port, PS/2™ Mouse Port and PS/2 101-Key Keyboard Port

80MB LCD ..... **$1586.93** CDW 29534

120MB LCD/ Color ...**$1709.85/$2336.44** CDW 29535/ 29537

200MB LCD/ Color ...**$1959.68/$2586.27** CDW 29536/ 29538

T4500 T4500/C
Hot Active Matrix Values!

PCMCIA

✓ i486SX/20 Processor ✓ MaxTime™ Power Management System 3.3 Volt Technology for Extended Battery Life ✓ 4 MB RAM., Exp. to 20 MB ✓ 8KB Cache ✓ 640 x 480 Display ✓ Simultaneous Display on External Monitor ✓ BallPoint™ Mouse with QuickPort™ ✓ **PCMCIA** Slot ✓ Windows 3.1, DOS and UltraFont Software ✓ Parallel, 1 Serial, 1PS/2 Mouse and 1 PS/2 Keyboard Port ✓ 1 150-Pin Bus Connector ✓ **Monochrome**:9.5" Diagonal, 64 Gray Scales. **Color**: 8.5" Diagonal, TFT-LCD Active Matrix 256 Color Display

80 MB LCD .....**$1793.62** CDW 25545

120MB LCD/ COLOR....**$1989.98/ $3189.32** CDW 25546/ 25551

200 MB LCD/ COLOR **$2289.57/ $3074.39** CDW 29059/ 29060

CALL FOR FREE CDW® CATALOG

CDW® Sells for Less and Services You Better!

(800) 359-4CDW

WOR359

©1993 CDW® Computer Centers, Inc.

SAVE EVEN MORE, SEE OUR ADS ON PREVIOUS PAGES

WE WILL TRY TO MATCH OR BEAT ANY ADVERTISED PRICE

WE ACCEPT PO'S FROM QUALIFIED FIRMS

M E M O R Y

NO SURCHARGE FOR MC, VISA AE & DISCOVER

CACHE MEMORY

	15NS	20NS	25NS
8Kx8	8.00	7.00	6.50
32Kx8	9.50	8.00	7.50
64Kx1	14.00	8.00	7.00
64Kx4	12.00	10.00	8.00
16Kx4	9.00	7.00	5.00
128Kx8	–	54.00	39.00

CPU UPGRADE 386 DX, SX

Boost your speed by 50%-60%
Comes with Cache software
Change existing CPU Chip with:

Cyrix 486 DLC 40MHZ	199.00
33MHZ	179.00
25MHZ	118.00
Cyrix 486 SLC 33MHZ	159.00
25MHZ	128.00

Individual D-RAM Chips

MEMORY FOR IBM & APPLE

	60NS	70NS	80NS	100NS
1Megx1	5.25	4.75	4.50	–
1Megx4	24.00	20.00	18.00	–
1Megx4 (Zip Pack)	25.00	21.00	19.00	–
256 x 4 (Video Zip)	–	–	15.95	12.95
256x4	4.75	4.50	–	–
256 x 1	3.20	2.80	2.60	2.40
256 x 16(SOJ)	–	–	29.50	–
64x4	–	–	3.00	–
64x1	–	–	–	2.00

INTEL Math Chips

8087	49.00
8087-2	69.00
8087-1	89.00
80287-XL	74.00
80387-16 DX	54.00
80387-20 DX	59.00
80387-DX (Does All)	89.00
Intel SX (Does All)	89.00
Intel SL Mobil	89.00
Intel 16SX	54.00
Intel 20SX	59.00

SIMM MODULES (Add $5.00 for SIPP)

	40NS	53NS	60NS	70NS	80NS	100NS
1Meg x 9	59.00	54.00	45.00	41.00	40.00	37.00
4Meg x 9	–	–	179.00	150.00	144.00	–
16Meg x 9 (9 chip)	–	–	–	990.00	–	–
16Meg x 9 (36 chip)	–	–	–	819.00	–	–
256 x 9	–	–	20.00	19.00	18.00	17.00

72 PIN SIMMS (EISA)

256 x 36 1Meg	–	–	–	50.00	–
512 x 36 2Meg	–	–	89.00	84.00	–
1 x 36 4Meg	–	179.00	165.00	160.00	–
2 x 36 8Meg	–	333.00	329.00	319.00	–
4 x 36 16Meg	–	719.00	649.00	639.00	–
8 x 36 32Meg	–	–	1899.00	1899.00	–
16 x 36 64Meg	–	–	5000.00	–	–

CYRIX FASMATH PROCESSOR

Programs executed up to 3X faster • Plug & object code compat. w/Intel
83D87-40MHz – **99.00** 83D87-33MHz – **84.00** 83S87-25SX Ver. – **79.00**
83S87-33SX – **99.00** PC Week™ rated #1 over all math chips
5 Year Warranty • "All Downward Compatible"

AST MEMORY MODULES

MODEL	AMT. UPGRADED	AST PART #		PRICE
Advantage 12-386	4Meg Kit	500510-004		179.00
8ravo 486/25, 33	2Meg Kit	500780-005		120.00
	8Meg Kit	500780-001		298.00
8ravo 486	4Meg	500987-002		165.00
	8Meg Kit	500987-003		330.00
	16Meg	500987-004		655.00
Premium 386/25, 16 SX	1Meg	500718-001		55.00
Premium 386/33	1Meg	500718-002		56.00
Premium II 386SX20, 486-25, 25E, 33	1Meg	500780-003	WP8	60.00
	4Meg	500780-004	WP8	160.00
Premium Tower, 386/33TE, 486/25TE, 486/33TE	8Meg	500780-001	WP8	320.00
Cupid Memory 8oard	0-32Meg	500818-001		149.00

ZENITH MEMORY MODULES

MODEL	AMT. UPGRADED	AST PART #		PRICE
Z386/33, 25, 20, 33E	1Meg	ZA3800ME		50.00
Z386/33, 25, 20, 33E, 486/25E	4Meg	ZA3800MK		160.00
Z386SX	2Meg	Z-605-1	modules	99.00

MAGNAVOX

286/386SX-16, 386SX-20, 486SX-20 & 386-33 *all are 72PIN SIMM.*
1MEG – 50.00 4MEG – 149.00 8MEG – 309.00 16MEG – 669.00

MEMORY BOARDS

IBM Compatibles & PS/2

USES SIMMS

BOCA AT PLUS

16 BIT MEMORY BO. FOR 286, 386 AT • 0K-8Meg 8d. 4.0 LIM Compat. • New 5 Yr. Warr. Convent., Expnd. & Extnd. Memory • Supports DDS, DS/2, LIM/EMS & EEMS • Versatile Split Memory Addressing • Operates w/CPU Speeds to 33 MHz • Supports Desqview, Multitask operations • ***Bd. made by Boca Research, AT plus***
0K – $89.00 2Meg – $159.00 4Meg – $229.00 8Meg – $359.00

BOCA XT 8 BIT BUS

• Expanded memory for XT • Lim 4.0 compat. 0-2Meg • Uses 256x1-100
D-K – **$99.00** 1Meg **$179.00** 2Meg – **$219.00**

8 BIT OR 16 BIT MEMORY BD.

• 0-16Meg Uses 1x9 and 4x9 Simms •Lim 4.0, Self Installing. No Switches or Jumpers.
D-K – **$144.00**

32 BIT MEMORY BD. FOR EISA BUS

• 0-128Meg Uses 1,2,4,8,16,32Meg 72 Pin Simms
0-K – **$239.00**

PS/2 MODEL 50, 60 EXP. MEMORY BD.

• 0-32Meg Uses 18M or Industry Standard 72 Pin Simms
D-K – **$179.00**

IBM P/S2 32BIT EXPANSION BD.

0-32Meg, Ext.-Expnd. Memory 8d for P/S2 70, 80, 90, Lim 4.0

0Meg	2Meg	4Meg	8Meg	16Meg	32Meg	64Meg
$179.00	$258.00	$328.00	$477.00	$799.00	$1,499.00	Call

PS/2 MCA 0-8MEG EXPANSION BD.

0-8Meg Extended and/or Expanded Memory for all 18M P/S2 Models 50, 50Z, 60, 55SX, 65SX, 16 8it, 4.0 LIM Compat.
0K – **119.00** 2Meg – **189.00** 4Meg – **259.00** 8Meg – **399.00**

USES 1 X 9 SIMMS BOCA BR MC-80

IBM PS/2 SIMM MODULES

IBM PART NO.	WORKS WITH MODEL NO.	PRICE
30F5348 (512K)	30-286	30.00
30F5360 (2Meg)	30-286, 25-286, 50 MTHR 8D.	79.00
33G9288 (2Meg)	Thinkpad 300.	109.00
33G9288 (8Meg)	Thinkpad 300.	339.00
6450375 (1Meg)	80-041	79.00
6450379 (2Meg)	80-111, 311-121, 321, 081, 161	94.00
6451060 (4Meg)	80-A21, A-61, 80-A31, 80-111, 80-311	189.00
6450603 (1Meg)	35SX, 40SX, 55SX, Model-70's, P-70	45.00
6450604 (2Meg)	70-061, E61, 121, 50Z, 55SX, 65SX, P-70, 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	82.00
6450608 (2Meg)	70-A21, A-61, 8-21, 8-61, 35SX, 35LS, 40SX Value Point 325T	86.00
78X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	159.00
87F9977 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	159.00
1057035 (512K)	P/S1-286	40.00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	92.00
92F9694 (4Meg)	P/S1 & P/S1/386SX, Model-2121	144.00
6450902 (2Meg)	56, 57, 57SX,90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	89.00
6450128 (4Meg)	57SX, 90, 95, P-75, 57SLC, 56, 56SLC, P/S1, 386SX, Models-2123, 2133, 2155, Value Point 77 486DX2, 486SX, SVR 85	165.00
6450129 (8Meg)	35SX, 40SX	319.00
6450130 (8Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	319.00
79F0999 (2Meg)	LX40, N33SX, PS Note	89.00
79F1000 (4Meg)	LX40, N33SX, PS Note	169.00
79F1001 (8Meg)	LX40, N33SX, PS Note	319.00
07G1826 (2Meg)	N51 (all)	99.00
07G1827 (4Meg)	N51 (all)	179.00
07G1828 (8Meg)	N51 (all)	319.00
07G1420 (4Meg)	CL57LSX LpTp, Thinkpad 700, 700C, 720, 720C	189.00
07G1421 (8Meg)	CL57LSX LpTp, Thinkpad 700, 700C, 720, 720C	319.00
92F8804 (2Meg)	N45SL	99.00

COMPAQ MEMORY MODULES

MODEL	AMT. UPGRADED	CMPQ PART #	PRICE
DeskPro 386/33, 386/33L, 486/25, 486/33L, 486/50L, System Pro	2Meg Module	115144-001	89.00
	8Meg Module	116561-001	339.00
	32Meg Module	116568-001	1500.00
DeskPro 386/33L, 486/33L	(Exp Bd)	116569-001	289.00
DeskPro 386/25, 386/20	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	174.00
DeskPro 386S-16MHz	1Meg Exp 8d	113633-001	110.00
	4Meg Exp 8d	113634-001	239.00
	1Meg Module	113646-001	75.00
	4Meg Module	112534-001	174.00
DeskPro 386/20E	1Meg Exp 8d	113644-001	119.00
DeskPro 386/25E	4Meg Exp 8d	113845-001	239.00
	1Meg Module	113131-001	75.00
	4Meg Module	113132-001	174.00
DeskPro 286N, 386N, 386SX/20, 386/25M, 486/33M, 486S/25M, 486S/16M	1Meg Module	118888-001	50.00
	2Meg Module	118689-001	85.00
	4Meg Module	118690-001	149.00
Port. 486C	8Meg Module	128877-001	309.00
M Series Exp 8d	0-64Meg	129160-001	279.00
DeskPro 386/16	1Meg Kit	108071-001	99.00
	4Meg Kit	108072-001	269.00
	1-2Meg Exp 8d	108069-001	239.00
	4-8Meg Exp Bd	108070-001	399.00
DeskPro 286	512K Kit	113012-001	59.00
Prolinea 386 3/25S, 3/252S	2Meg	141738-001	99.00
	8Meg	141742-001	299.00
Prolinea 486 4/25S, 4/33, 4/50, 4/66, CDS	1Meg	141682-001	55.00
	2Meg	141683-001	98.00
	4Meg	141684-001	159.00
	8Meg	141685-001	319.00
Prosignia PC Server, 486/33, 486 DSX/66	8Meg	141685-001	349.00
	16Meg	149320-001	679.00
	32Meg	149147-001	1949.00

COMPAQ LAPTOPS & NOTEBOOKS

LTE/286	2Meg 8d	117081-002	99.00
LTE/286	4Meg 8d	117081-003	179.00
LTE/386S/20	4Meg Module	121125-002	199.00
LTE LITE/20, 25, 25C	4Meg Module	129769-002	199.00
LTE LITE/20, 25, 25C	8Meg Module	129769-003	319.00
LTE LITE/20, 25, 25C	16Meg Module	129769-004	699.00
LTE LITE 4/25C	4Meg Module	142337-002	199.00
LTE LITE 4/25C	8Meg Module	142337-003	299.00
LTE LITE 4/25C	16Meg Module	142337-004	749.00
SLT/286	1Meg Module	110235-001	79.00
SLT/286	4Meg Module	110237-001	209.00
SLT/386	1Meg Module	118303-001	79.00
SLT/386	2Meg Module	118304-001	99.00
SLT/386	4Meg Module	118305-001	159.00
Contura 320, 325	2Meg	139497-001	99.00
	4Meg	139498-001	169.00
	8Meg	139499-001	299.00
Contura 4/25, 4/25C, 4/25CX	4Meg	146520-001	189.00
	8Meg	146521-001	369.00
	16Meg	146531-001	939.00

PCMCIA VERSION 2.0 (for Palmtop & Subnotebooks)

MODEL	PRICE
S-RAM Cards 1MEG	159.00
S-RAM Cards 2MEG	239.00
Card Pro (made by Data I/D) Transfers data from PCMCIA card to desktop PC, connects to a parallel port	399.00
14,400/14,400 Data/Fax Modems	Call
9600/9600 Data/Fax Modems	Call
2400/9600 Data/Fax Modems	189.00
Lan Ethernet (10 8ase T)	Call
Visual Media (CD Rom, Tape Drive)	Call

NO SURCHARGE FOR MASTERCARD, AMEX VISA OR DISCOVER PURCHASE ORDERS ACCEPTED FROM FORTUNE 2000 GOVERNMENT & INSTITUTIONS Price & availability subject to change California orders add 8.25%sales tax Returned orders or ordered wrong parts are subject to a 20% restocking fee (Memory chips not installed in boards.) We accept International orders shipped via UPS Air, APO, FPO orders welcome Customers are expected to pay customs and "other" charges if shipped Int'l All credit card charges verified for fraudulent use SORRY, NO REFUNDS AFTER 30 DAYS – EXCHANGES ONLY We accept MC, VISA, Discover, AE, prepard orders, purchase orders, wire transfer, COD (cashiers check) orders, cash & cashiers checks Orders shipped by UPS, FEOX must be signed for • ALL MANFACTURER PART #'S ARE FOR REFERENCE ONLY • MINIMUM ORDER $40.00

All products Brand new & guaranteed • We buy excess inventory
Trademarks are registered with their respective companies.

L.A. TRADE

22825 Lockness Avenue • Torrance, CA 90501

TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
T1000SE/XE/LE	2Meg	PC14-PA8312U	84.00
T2000/T2000SX	2Meg	PC18-PA8317U	84.00
T2000SX/T1000LE	4Meg	PC-PA8314U	159.00
T2000SX/T1000LE	8Meg	PC14-PA8315U	279.00
T2000SXE/2200SX/T1800, 1850, C	2Meg	PC-PA2000U	84.00
T2000SXE/2200SX/T1800, 1850, C	4Meg	PC-PA2001U	159.00
T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2002U	279.00
T4400SX, SXC T6400	4Meg	PC-PA2004U	164.00
T4400SX, SXC T6400	8Meg	PC-PA2005U	299.00
T4400SX, SXC T6400	16Meg	PC-PA2010U	599.00
T4400SX, SXC,T6400	32Meg	N/A	2599.00
T4500, T4500C, T4600, T1900, T1900C (3.3 v)	4Meg	PC-PA2012U	239.00
T4500, T4500C, T4600, T1900, T1900C (3.3 v)	8Meg	PC-PA2013U	419.00
T4500, T4500C, T4600, T1900, T1900C (3.3 v)	16Meg	PC-PA2014U	1299.00
T4500, T4500C, T4600, T1900, T1900C (3.3 v)	32Meg		3299.00
T3300SL	4Meg	PC-PA2007U	169.00
T3300SL	6Meg	PC-PA2008U	229.00
T3300SL	8Meg	N/A	369.00
T3300SL	16Meg	PC-PA2009U	749.00
T1200XE	2Meg	PC13-PA8306	85.00
T1600	2Meg	PC8-PA8302U	85.00
T3100	2Meg	PC3-PA7135E	129.00
T3100e	2Meg	PC9-PA834DU	85.00
T3100SX	2Meg	PC15-PA8308U	85.00
T3100SX	4Meg	PC15-PA8310U	164.00
T3200	3Meg	PC6-PA7137U	159.00
T3200SX	2Meg	PC12-PA8307U	85.00
T3200SX	4Meg	PC12-PA8909	164.00
T3200SXC	2Meg	PC19-PA8318U	84.00
T3200SXC	4Meg	PC19-PA8319U	164.00
T5100	2Meg	PC7-PA8301U	89.00
T5200/T8500	2Meg	PC10-PA8304U	89.00
T5200/T8500	8Meg	PC10-PA8313U	299.00

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
ALR Venture	4Meg	12407980	229.00
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	149.00
AST Power Exec 3/25C, 425EL	4Meg		179.00
AST Power Exec 425SL	4Meg		249.00
AST Power Exec 425SL	16Meg		1319.00
AT&T Safari NSX/20	4Meg	PEC 37651	189.00
8ondwell B310, Plus	1Meg	23050-09100	109.00
8ondwell B310V, SX	1Meg		109.00
Bondwell B310V, SX	4Meg		219.00
Epson N83	4Meg	A808511	179.00
Epson N8/SL 20,25,25C	2Meg	A808771	129.00
	4Meg	A808781	219.00
	8Meg		479.00
Everex Tempo LX, LX20	2Meg	PCA 00053-0001	89.00
Everex Tempo Carrier	2Meg	PWA 0884-A-J000	119.00
Goldstar GS520 386SX/16	4Meg	S386-4M	239.00
Leading Edge D/LT 386SX	1Meg		109.00
Magnavox Metalis	1Meg, 4Meg	286, 386SX	99.00,189.00
NCR 3170	4Meg	3123-K104-V001	239.00
NCR 3170	8Meg		519.00
NCR 3170	16Meg	3123-K116-V001	925.00
NEC Prospeed 286, 386SX-16	1Meg	PC21-21	105.00
NEC Prospeed 286, 386SX-16	4Meg	PC21-22	179.00
NEC Prospeed 386	2Meg	PC31-21	129.00
NEC Prospeed 386	8Meg	PC31-22	359.00
NEC Prospeed 386SX-20	1Meg	PC43-21	109.00
NEC Prospeed 386SX-20	4Meg	PC43-22	199.00
NEC Ultralite III/20, 20P, 25C	2Meg	PC47-21	119.00
NEC Ultralite III/SL/25C	4Meg	PC47-22	219.00
NEC Ultralite SL/20, 20P	6Meg	PC49-21	289.00
NEC Ultralite III/25C	8Meg	PC47-23	349.00
NEC Ultralite Versa	4 Meg/8Meg/16Meg		229/429/1399
Packard 8ell 386SX, 286	1Meg, 4Meg	286, 386SX	89.00,189.00
Panasonic CF170, CF270, CF370	1Meg	CF-8A165	54.00
Sanyo 17/18 N8	2Meg	M8C-N8MEM2	89.00
Sharp 6781, 6881, 6785	2Meg/4Meg		109.00/199.00
Sharp PC-6220	1Meg	CE 6218	85.00
Tandon, PC 8rand, Dataworld	2Meg, 8Meg	N8386SX-20	89.00, 499.00
TI Travelmate 2000	1Meg	2568034-0001	85.00
TI Travelmate 3000	2Meg	2566996-1	79.00
TI 4000	4Meg, 16Meg		199.00, 1599.00
Twinhead, Altima, Compudyne Tandy 4860, 486SX, DX	4Meg/16Meg		199.00/999.00
Zeos 386SX Notebook	2Meg		89.00
Zenith Master Sport 386SX	2Meg	ZA-300-1	99.00
Zenith Master Sport SL, SLE	2Meg	ZA-4-4	89.00
Zenith Super Sport 286, 286E	1Meg	ZA-180-68	89.00
286E, SX	2Meg	ZA-180-64	109.00
SX Alpha	2Meg	ZA-180-86	109.00
SX 8eta	2Meg	ZA-180-87	109.00
Zenith Z-Note 325L, LC	2Meg/8Meg	ZA3250-4/-5	129.00/369.00

LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	OK 8d	256k	1	2	3	3.5	4	5	6	8	16	32
Canon L8P4, 4Lite, 4plus	–	–	119	169	–	–	–	–	–	–	–	–
Canon L8P-4SX	–	–	89	249	–	–	–	–	–	–	–	–
Compaq Pagemarq	–	–	69	99	–	–	169	–	–	299	–	–
Epson 6000, Action Laser	–	–	–	115	–	–	179	–	–	–	–	–
Epson Action Laser II	–	–	99	–	169	–	–	249	–	–	–	–
Epson 8000	–	–	99	–	169	–	–	249	–	–	–	–
Epson 1000	–	–	–	72	–	–	144	–	216	–	–	–
HP 2, 2D, 3, 3D, 3P, 2P 2P+	–	–	–	99	–	–	159	–	–	–	–	–
HP 4, 4M, 4SI, 4SIMX	–	–	–	80	–	–	149	–	–	309	–	–
HP 4L	–	–	69	–	–	–	–	–	–	–	–	–
HP 3SI	–	–	49	–	–	–	139	–	–	309	–	–
HP 4SI	–	–	–	80	–	–	149	–	–	309	–	–
HP Deskjet 500, 500C, 550	–	55	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/P	–	–	–	129	–	–	209	–	–	399	–	–
HP Paintjet XL300	109	–	–	–	–	–	268	–	–	–	745	–
18M Laser 4019, 4019E	–	–	–	–	–	144	–	–	–	–	–	–
18M Laser 4029	–	–	–	–	–	–	139	–	–	–	–	–
18M Laser 4039	–	–	–	–	–	–	169	–	–	319	–	–
NEC 90, 290	–	–	–	109	–	–	–	–	–	–	–	–
NEC 95	–	–	–	99	–	–	–	–	–	–	–	–
Dki 400	–	–	–	94	–	–	–	–	–	–	–	–
Dki 830, 840	–	–	–	109	–	–	–	–	–	–	–	–
Packard 8ell P8 9500	–	–	–	115	–	–	179	–	–	–	–	–
Panasonic 4420/4450I	–	–	–	119	–	–	189	–	–	–	–	–
Panasonic 4410/4430	–	–	–	109	–	–	169	–	–	–	–	–
Panasonic 4450	–	–	99	–	–	–	–	–	–	–	–	–
Star LS04	–	–	109	159	–	–	249	–	–	–	–	–
TI XL/PS17/PS35	–	–	49	–	–	–	–	–	–	–	–	–

H.P. COMPATIBLE FONT CARTRIDGE

8AR CODES 8ar Code Reader Fonts 99.00
DESKJET SOLUTION for DkJt 500 & Plus, 92 Fonts, 4.5 pt-30 pt 99.00
18M 4019, 4019E, FONT CARTRIDGE 209 Fonts, Turbo Card 105.00
TUR8O 25 Comparable to Pacific Data's 25 CARTRIDGES IN ONE!™, 143 Fonts *(compat. with Epson Action Laser II and all HP Printers except HP4)* 79.00
TUR8OSCRIPT™ 47 Scalable Fonts in Any Point Size (HP 2, 2D – 159) 149.00
TUR8OSCRIPT™ 109, 109 Scalable Fonts to Any Point Size (HP 2, 2D – 199) 179.00
TAX & FINANCE FOR 18M 4019, 4019E, 4029 ..... 139.00
TAX & FINANCE CARTRIDGE 84.00
DKI 400, 800 41 fonts, 11 typestyles 169.00

310-539-0019
FAX: 310-539-5844

WE'VE MOVED!!!!!

CALL TOLL FREE
1-800-433-3726
(US and Canada)

ESTAB. 1985

Mon-Fri, 8:00 a.m. to 5:00 p.m. PST
Sat. 10:00 a.m. to 12:00 noon

USA FLEX ...Top Quality

PRINTERS

HEWLETT PACKARD
Authorized Dealer

NEW AT USA FLEX!

The HP DeskJet Portable Printer

Plain paper drop-on-demand thermal inkjet printing

FLEX PRICE	$324
HP MAIL-IN REBATE	-75
YOUR COST AFTER MAIL IN REBATE	**$249**

EPSON LASER PRINTERS — EPSON

ACTION LASER 1500 ..... $659
ACTION LASER 1500-II $719
EPL-8000 ..... $819

EPSON DOT MATRIX PRINTERS

LX-810	$169	LQ-870	$454
AP 3250	$174	LQ-860 Clr.	$574
NEW LQ-570+	$244	LQ-1170	$624
FX-870	$274	LQ-2550 Clr.	$919
FX-1170	$624	DFX-5000	$1359
LQ-1070+	$359	DFX-8000	$2279

Stylus 800 Ink Jet Printer $289*
*Includes $50 Rebate from Epson

Panasonic Office Automation

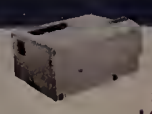
LASER PRINTERS

KX-P4410	$569	KX-P4455	$1679
KX-P4430	$659	KX-P5410	CALL
KX-P4440	$1099		

DOT MATRIX PRINTERS

KX-P1150	$139	KX-P1624	$329
KX-P2180	$159	KX-P1695	$344
KX-P2023	$199	KX-P2624	$359
KX-P2123	$229	KX-P1654	$524
KX-P2124	$299		

NEC



NEW LOWER PRICES!

LASER PRINTERS
SILENTWRITER Model 95f $889
SILENTWRITER Model 95fx $1099
SILENTWRITER Model 97 ..... $1079
SILENTWRITER Model 97fx $1299
NEC Jetmate 1000 ..... $329

TEXAS INSTRUMENTS — **NEW AT USA FLEX!**

microWriter $649
microWriter $879
microWriter $1129
microMarc™ ..... CALL

Canon

BUBBLE JET PRINTERS

BJ-5	$199	BJ-800C	$1499
BJ-10ex	$239	BJ-820C	$1629
BJ-200	$299		
BJ-230	$419		

LASER BEAM PRINTERS

LBP-4SX	$669	LBP-8SX	$1299

MONITORS

NEC

NEC 3D Color Monitor $359
NEC "OEM" Monitors
17" 5FG* .. $1129

15" 3FGe	$599
15" 4FGe	$699
17" 5FGe	$1069
17" 5FG	$1249
21" 6FG	$2279

SAMSUNG ELECTRONICS

14" CVL4955 ..... $219
14" SyncMaster 2 $249
14" SyncMaster 3 ..... $279
14" SyncMaster 3n $309
15" SyncMaster 15C $449
17" SyncMaster 4 Plus $649
17" SyncMaster 5C $899

FLEXVISION

14" 1024X768 ..... $289
15" 1280X1024 ..... $429

CTX

14" 5439-A $229
14" 5468/NI .. $269/289
14" CPS 1461LR $309
15" CPS1561 ..... $389
15" CPS 1560LR $429
17" CPS 1760 Proscan $799

MAG 14" $319
15" MX15F $549
17" MX17F $949

HITACHI SuperScan™

15" $499
17" $949
20"/Pro20" $1399/1699
Pro21" $2199

SONY

14" CPD-1320 ..... $339
14" CPD-1304S $499
17" CPD-1604S $949
20" GDM-2036S ... $2099

CD-ROM SPECIALS

MultiMedia CD/ROM Upgrade Kit *for only...* **$299**

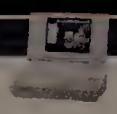
- **Mitsumi Internal CD-ROM**
- **Sound Galaxy Nx PRO MA**

Sound card w/16-bit I/F. Connects directly to CD/ROM drive. 20 FM systhesized channels. Stereo MIC input. Manual and S/W Volume Control, Includes applications S/W, Does not require a CD ROM caddy, Includes 2 stereo speakers.

~Software Bundles!~
5 Educational Titles or 5 Entertainment Titles Your Choice Only $139
When puchased with CD-ROM Upgrade Kit

LAPTOPS

TOSHIBA



T1900, i486SXA-20, 80MB $1599
T1900, i486SXA-20 120/200MB ..... $1729/$1979
T1900C, i486SXA-20 120/200MB ..... $2389/$2649
T4500*, i486SX-20 80/120/200MB $1829/$1999/$2329
T4500C*, i486SX-20, Active Color 120/200MB ..... $2899/$3149
T4600, i486SL-33 120/200MB ..... $2799/$3049
T4600C, i486SL-33 120/200/340MB $3949/$4259/$4699
T6600C*, i486DX2-66, 510MB . $6399
T6600C/CD*, i486DX2-66, 510MB $6899
T6600C/CDV*, i486DX2-66, 510MB $7999

*AC power only

TI TravelMate™ Notebook Computers

TEXAS INSTRUMENTS

TravelMate WinSLC™ 25MHz
80MB, 4MB RAM $1489
TravelMate 4000
WinSX/25 - 4MB
120MB $1889
Color, 120MB $2589
WinDX/25 - 4MB
120MB $2089
200MB $2249
WinDX2/40 Color - 8MB
200MB $3589
WinDX2/50
120MB, 4MB $2649
200MB, 8MB $2989
WinDX2/50 Active Matrix Color
200MB, 4MB $4289

TAPE BACK-UP

COLORADO MEMORY SYSTEMS INC.

Ask about special on tape caddy.

JUMBO 120 120MB storage capacity INT. SYSTEM $149 . EXT. SYSTEM $239
JUMBO 250 250MB storage capacity INT. SYSTEM $179 EXT. SYSTEM $269
JUMBO TRAKKER 120MB $289
JUMBO TRAKKER 250MB $349
POWERTAPE™
2GB INT./EXT. $949/1089
4GB INT./EXT. $1489/1589

DATA CARTRIDGES

3M

DATA CARTRIDGES

DC2000	40/80MB	$15.95 ea.
DC2060	Thetamat (QIC-40)	$29.95 ea.
DC2080	80/160MB	$19.95 ea.
DC2080	Rhomat (Ir-80)	$22.95 ea.
DC2120	120/250MB	$21.95 ea.
DC2120	Ximat (QIC-80)	$26.95 ea.
DC6150	250/500MB	$21.49 ea.
DC2060	Kappmat (Ir-60)	$25.95 ea.
DC6250	250/500MB	$25.49 ea.
DC6525	350/700MB	$32.95 ea.

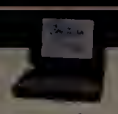
H-P FAX MACHINES

HEWLETT PACKARD

HP FAX-200 Plain paper fax $929
HP FAX-310 Plain paper fax $1179

COMPAQ SYSTEMS

COMPAQ



ProLinea 3/25zs from $699
ProLinea 3/25s from $829
ProLinea 4/25s from $1,069
ProLinea 4/33 from $1,449
ProLinea 4/50 from $1,869
ProLinea 4/66 from $2,289
DESKPRO 3/33I from $1,349
DESKPRO 4/25Is from $1,329
DESKPRO 4/33I from $1,729
DESKPRO 4/66I from $2,119
DESKPRO 386/33M from $1,929
DESKPRO 486s/25M from $1,839
DESKPRO 486/33M M1** from .. $1,859
DESKPRO 486/33M from $2,139
DESKPRO 50M from $2,379
DESKPRO 66M from $2,999
Contura 3/25 from $1,449
Contura 3/25C from $1,979
Contura 4/25 from $2,179
Contura 4/25 CX Color from $3,439
LTE Lite/25C from $2,969
LTE Lite/25E from $2,529
Call Your Sales Representative for details.

SPECIAL PRICES On Genuine COMPAQ Monitors

Video Graphics Color, 14" $199
1024 Color, 14" $319
1024 Color Low Emissions, 14" $359
QVision 150 Color, 15" $689
QVision 170 Color, 17" $1039

VIDEO CARDS

DIAMOND Computer Systems, Inc.

SPEEDSTAR PRO 1MB ISA/VLB ..... $119/$129
STEALTH PRO VLB 2MB $349
VIPER VLB 2MB $409

ATI Technologies Inc. — Perfecting The PC

GRAPHICS ULTRA+ 1MB/2MB .. $219/$249
GRAPHICS ULTRA™ PRO 2MB ISA/VLB/EISA . $369/$369/$399

ORCHID

ProDesigner II/s 1MB $149
Fahrenheit 1280+ 1MB ISA/VLB ..... $179/$189
Fahrenheit VA 1MB ISA/VLB ..... $199/$229
Celsius VLB 1MB $279

MODEMS

Hayes

	Int./Ext.
ACCURA 2400	$65/$75
ACCURA 96+FAX96	$209/$229
ACCURA 144+FAX144	$239/$259
POCKET EDITION™ 2400	$119

U.S. Robotics — The Intelligent Choice in Data Communications

	Int./Ext.
Sportster 9600 FAX	$169/$179
Sportster 14.4 FAX	$189/$209

FLEX *ultimate*
14,400/14,400 V.32 MODEM
Communication S/W and FaxWorks Fax S/W both for DOS and Windows.
Int. $165 Ext. $175

TO ORDER CALL...

1-800-876-5606

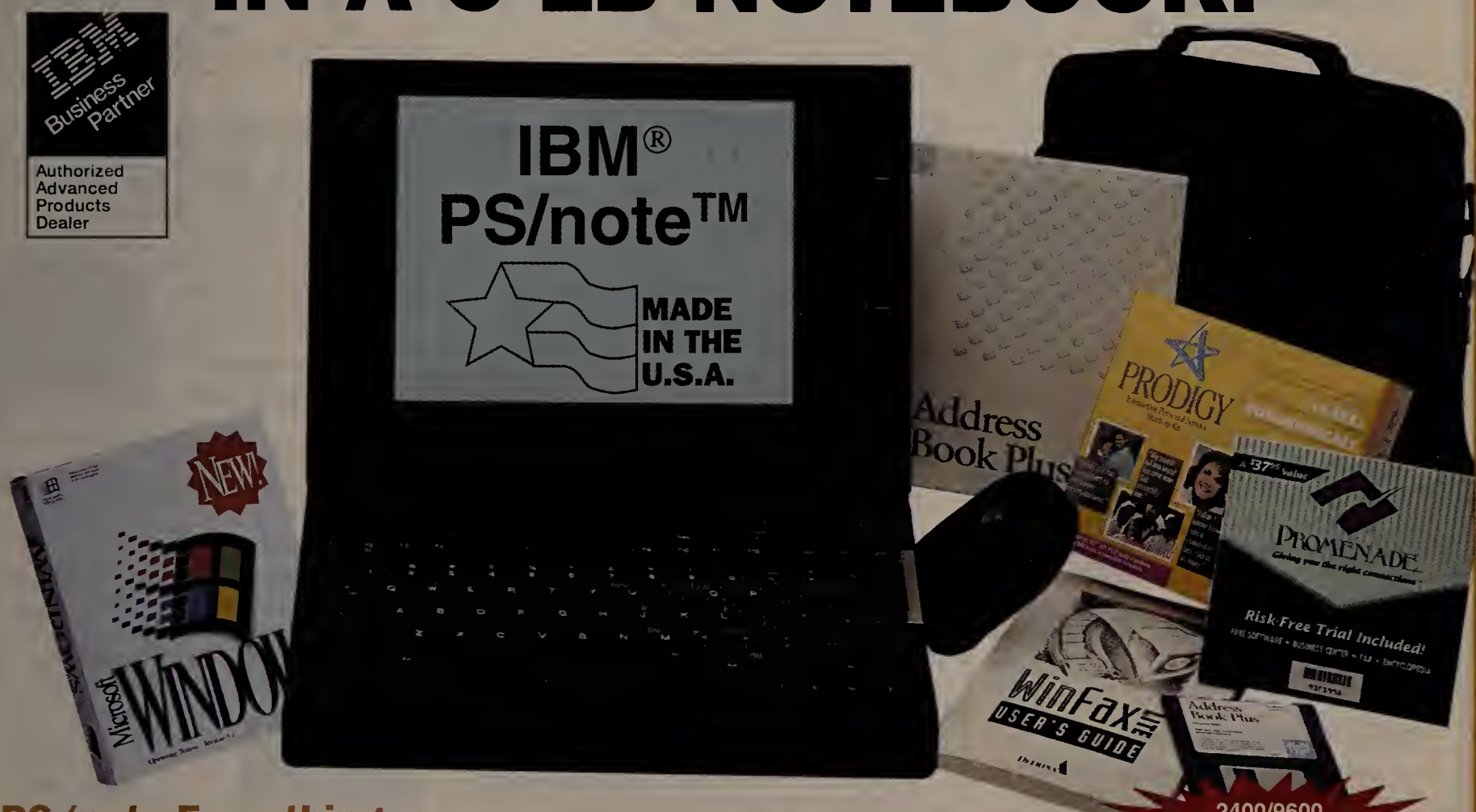
USA FLEX
471 Brighton Drive, Bloomingdale, IL 60103
CODE # WD0903

OPEN 24 HOURS MONDAY THRU FRIDAY SAT. & SUN. 9 A.M. - 4 P.M.

...nerals at Low Discount Prices!

10 LBS OF IBM VALUE IN A 5 LB NOTEBOOK!

IBM Business Partner
Authorized Advanced Products Dealer



PS/note-Everything Shown Here Plus More!

All For Only... **$1499**

PSNOTE

IBM Quality and Reliability

- Light Weight-only 5.2 lbs with battery!
- Small Size-8.3" D x 11.7" W x 1.9" H
- Intel 386SL-25MHz with energy saving features
- 2MB memory, expands to 10MB
- 3.5" 1.44MB internal diskette drive
- 85 MB 18ms hard disk
- 2400/9600 internal data/fax modem with S/W
- Large 10" backlit VGA display-with 64 shades of gray
- 85 key keyboard, full size keys, inverted "T" cursor
- Genuine LogiTech Trackman portable mouse
- NiCd batteries, 4+ hrs use, 1-hr quick recharging
- Free custom carrying case (with mail-in coupon)
- 1 year IBM limited warranty with 48 hour Express Maintenance

FREE PRELOADED SOFTWARE*

intel inside

- IBM PC-DOS 5.0
- MS Windows 3.1
- WinFax LITE-Makes faxing quick and easy
- PRODIGY*-Intro to online weather, stock quotes & more
- Promenade**-Intro to online encyclopedia, business center, special interest clubs & more
- Address Book Plus-Print labels, envelopes... place calls
- PS/note Tutorial-Get started using Windows
- PS/note Index-Get the most from your PS/note
- PS/note Fitness-Virus check

*Software is all pre-installed. There are no diskettes included.

(708) 582-6206 • FAX (708) 351-7204
Government 1-800-723-2260/Education 1-800-944-5588
Government/Education FAX (708) 351-9871
Habla Espanol 1-800-723-5500 • (708) 924-6780
Pour les Francophones 1-800-723-2256 • (708) 582-6179
Verhandlungen in deutsch (708) 924-6680
(7:00 Uhr bis 15:00 Uhr)(Midnight to 9:00 a.m. cst)
Customer Service 1-800-955-1488
(7:30 a.m. - 6:00 p.m. Mon.-Fri. & Sat. 9 a.m. - 2 p.m. CST)

ORDER INFORMATION: Minimum order $80. Minimum shipping and handling per order $11.95. MasterCard, Visa and Discover accepted for USA, Canada, APO, FPO and Puerto Rico. FLEXCARD accepted for continental USA only. A $10 surcharge on credit card orders for APO, FPO and Puerto Rico. C.O.D. order under $500.00, add $5.00; over $500.00, add $10.00 check warranty charge. Call for special UPS Red/Blue C.O.D. rates. APO/FPO, add 5% to cover additional shipping and handling. Call for PAL rates. **CORPORATE/GOVERNMENT ORDERS:** Corporations rated 1A1 or better and government agencies accepted on Net 30 terms with receipt of a valid purchase order. Leasing Plans available for qualified businesses only. **RETURN PRODUCT INFORMATION:** All returns must have prior authorization from our Customer Service Department (1-800-955-1488 or 1-708-351-7172 Mon.-Fri. 7:30 a.m. to 6 p.m. & Sat. 9 a.m. to 2 p.m. cst). All returns must be in as-shipped condition, with original packaging, including all warranty cards and manuals. Incomplete product returns, unauthorized returns and refused shipments are subject to a minimum 20% re-stocking charge. We will only accept returns on unopened and non-downloaded software. Software compatibility guaranteed only if we have downloaded it on your new FLEX system. Thirty(30) day money back guarantee applies to FLEX system only (does not include printers or other non-installed peripherals). We will not accept returns on laser printers if toner cartridge has been installed. All prices and specifications subject to change, without notice. Not responsible for typographical or printing errors. All trademarks and registered trademarks are of their respective holders.©1993 USA FLEX.

Circle 148 on reader service card

CODE # WD0903

SOFTWARE TRAINING VIDEOS

LEARN FROM

For optimum software performa

OVER 100 TITLES TO CHOOSE FROM – CALL 1-800-937-3279 EXT. 10

WordPerfect 6.x

Learning WordPerfect couldn't be easier! Karen Acerson, Carolyn Dillon, and Daniel Will-Harris are the expert instructors of this popular and powerful software. These tapes are a great addition to any training program. DOS and Windows versions available.

EACH TAPE $49.95
2 HOURS PER TAPE

WordPerfect 6.x Combination Special $159.95

- ❑ Beginning WP 6.x
- ❑ Intermediate WP 6.x
- ❑ Advanced WP 6.x part 1
- ❑ Advanced WP 6.x part 2

Other WordPerfect 6.x tapes available

❑ WP Macro Magic 6.x, ❑ Perfecting the Office 6.x, ❑ WordPerfect DTP 6.x

Other WordPerfect Videos

❑ WordPerfect Dissertation, ❑ All About WordPerfect Office, ❑ Perfect Publishing with WP (4 hrs) $99.95, ❑ WordPerfect & Your Laser Printer $39.95.

Karen Acerson
author of *WordPerfect: The Complete Reference* and *WordPerfect: From 5.0 to 5.1.*

Graphics Videos

EACH TAPE $59.95
2 HOURS PER TAPE

- ❑ Beginning Harvard Graphics DOS 3.0 or Win
- ❑ Advanced Harvard Graphics DOS 3.0 or Win
- ❑ Corel Draw 3.0 Publication Design & Production
- ❑ Corel Draw 3.0 Special FX
- ❑ Ventura Publisher
- ❑ Ami Pro Desktop Publishing
- ❑ Word Desktop Publishing
- ❑ WordPerfect Presentations (coming soon)

WordPerfect for Windows

EACH TAPE $49.95
2 HOURS PER TAPE

WordPerfect for Windows Combination Special $129.95

- ❑ Beginning WP/Win
- ❑ Intermediate WP/Win
- ❑ Advanced WP/Win

Other WordPerfect for Windows tapes available

❑ WordPerfect for Windows Update, ❑ WP/Win Macro Magic, ❑ Perfecting the Office, ❑ WordPerfect/Windows DTP, ❑ WordPerfect/Windows Update 5.2

Word for Windows

In this Word for Windows series of videos, Tom Badgett will help you understand the many features & functions of Word. From beginning, to intermediate, to advanced, these tapes are a must if you are using Word for Windows.

EACH TAPE $49.95
2 HOURS PER TAPE

Word for Windows 2.x Combination Special $129.95

- ❑ Beginning Word for Windows
- ❑ Intermediate Word for Windows
- ❑ Advanced Word for Windows

Tom Badgett
author of *Word for Windows, Word for DOS, & Word for Macintosh.*

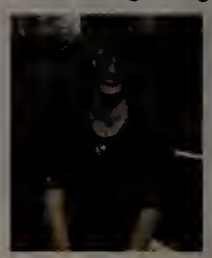
WordPerfect 5.1 Legal Series

Carolyn Dillon teaches basic and advanced WordPerfect 5.1 techniques that will help any legal office become more efficient.

EACH TAPE $59.95
2 HOURS PER TAPE

WordPerfect Legal Combination Special $195.00

- ❑ Legal Office Basics
- ❑ Legal Short Cuts
- ❑ Document Assembly Using Merge
- ❑ Building a Legal Forms Library



Carolyn Dillon
Certified WordPerfect instructor and legal office expert.

Excel 4.0

Basic instruction of Beginning, Intermediate, & Advanced tapes are taught by Dr. Robert Voss. These tapes will help the user understand the operation of this fabulous spreadsheet/database program.

EACH TAPE $49.95
2 HOURS PER TAPE

Excel 4.0 Combination Special $129.95

- ❑ Beginning Excel/Windows
- ❑ Intermediate Excel/Windows
- ❑ Advanced Excel/Windows

Other Excel 4.0 Videos

Reed Jacobson, a certified Microsoft "Partner", teaches the more advanced features of Excel.

- ❑ Names, Arrays, & References
- ❑ Processing Data Files

Call, Write, or FAX for a FREE Catalog!

FAX or mail orders to: LearnKey, Inc.
93 S. Mountain Way Dr. Rm. 10
Orem, UT 84058

Phone 801-224-8210
FAX 801-224-8211

3 EASY WAYS TO ORDER

Major Credit Cards Accepted: For your convenience we accept Visa, MasterCard, or American Express, call 1-800-937-3279. Please have card available.
Purchase Order: FAX or mail an authorized PO. Your order will be processed immediately.
Check or Money Order: Business Checks and Money Orders are processed immediately. Personal Checks please allow 2 weeks to clear.
When ordering please include: Video titles and quantities desired, shipping and billing address, phone #, version needed & computer diskette size.
Shipping: USA shipping charges: UPS Ground $5.00, UPS Blue $8.00, Overnight $20.00, Regular U.S. Mail or Canada $8.00. Additional charges for International shipping. Utah residents add 6.25% sales tax.

Circle 206 on reader service card

THE EXPERTS!

nce Press PLAY on your VCR!

Lotus 123 v.2.4

Robin Stark leads users through the basic and advanced features of Lotus 123. Best-selling author, Judd Robbins addresses this powerful new upgrade on every level of version 2.4. Both DOS and Windows versions available.

EACH TAPE $49.95
2 HOURS PER TAPE

Lotus 123 v. 2.4
Combination Special $129.95

- ❑ Beginning Lotus 123
- ❑ Intermediate Lotus 123
- ❑ Advanced Lotus 123

Lotus 123 v. 3.1 or Windows
Combination Special $89.95

- ❑ Beginning Lotus 123
- ❑ Advanced Lotus 123

❑ Update from DOS to Lotus for Windows $39.95

Robin Stark
University of California training specialist and author of *The Encyclopedia of Lotus 123*

DOS Videos

If your using DOS 6 on your computer and want to maximize your efficiency, don't miss this extemely thorough introduction to the biggest DOS upgrade ever.

EACH TAPE $49.95
2 HOURS PER TAPE

DOS 6.x
Combination Special $129.95

- ❑ Beginning DOS 6.x
- ❑ Intermediate DOS 6.x
- ❑ Advanced DOS 6.x

Other DOS tapes available

❑ Optimizing DOS 6.x, ❑ DOS 6.x for Windows Users, ❑ Controlling the DOS 6.x Startup, ❑ Mastering Batch Files & Macros, ❑ Mastering QBasic, ❑ DOS & Your PC, ❑ Upgrading to DOS 6.x, ❑ Discover DOS 3.3 & up, ❑ Using DOS 5.0

Judd Robbins
author of over 21 technical books including the recent best-seller *Mastering DOS 6.*

NetWare 4.X

Tom Sheldon, best-selling author of *NetWare 4: The Complete Reference*, guides you through the powerful features and important changes of NetWare.

EACH TAPE $99.95

- ❑ User's Guide to NetWare 4.x 60 Min.
- ❑ NetWare 4.x Concepts An Introduction for administrators, managers, supervisors, and other users. 2 hrs.

NetWare 3.X

Tim Gendreau, Certified NetWare Level II instructor takes you from the basics of networking to advanced security techniques.

EACH TAPE $125.00

NetWare
Combination Special $695.00

- ❑ NetWare Basics 70 Min.
- ❑ Setting-up NetWare Security 66 Min.
- ❑ Menu & File Server Utilities I 106 Min.
- ❑ Menu & File Server Utilities 2 67 Min.
- ❑ NetWare Printing 83 Min.
- ❑ Login Scripts 74 Min.
- ❑ Custom Menus 33 Min.

Other NetWare tapes

- ❑ NetWare 3.X Installation 69 Min.
- ❑ Installing WP on a Network 101 Min.

Tim Gendreau
Certified NetWare Level II instructor has taught hundreds of professionals the features & power of NetWare.

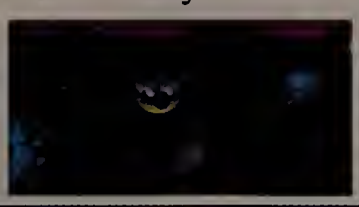
LANtastic Videos

EACH TAPE $59.95

LANtastic
Combination Special $240.00

- ❑ Getting Started 50 Min.
- ❑ Management & Security 30 Min.
- ❑ Server Config. & Perf. 60 Min.
- ❑ Network Printing 35 Min.
- ❑ Networking Windows 60 Min.

Mike Montgomery
author of *Networking with LANtastic*



Windows 3.1

Tom Sheldon guides you through the basics of Windows operation, including terminology, global commands, and starting applications.

EACH TAPE $49.95
2 HOURS PER TAPE

Windows 3.1
Combination Special $159.95

- ❑ Beginning Windows 3.1
- ❑ Windows 3.1 Applications
- ❑ Windows Adv. Tips & Tricks
- ❑ Optimizing Windows

Tom Sheldon
author of *Windows 3 Made Easy* and *Windows: The Complete Reference.*

❑ Supercharging DOS Applications under Windows 2 hrs $49.95

SUPERCHARGING DOS APPLICATIONS UNDER WINDOWS

Windows Primer

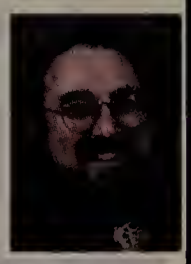
See Daniel do Windows!
Teach Daniel, Teach.

two videos for the technically impaired. Daniel Will-Harris tenderly holds your hand through a basic understanding of Windows & how to use it's applications. It's fun to learn.

EACH TAPE $29.95

Combination Special $50.00

- ❑ Introduction to Windows 2 hrs
- ❑ Windows Applications 90 min.



Daniel Will-Harris
author of *WordPerfect: Desktop Publishing in Style, & Ventura Tips & Tricks.*

Learn FROM THE Experts

WordPerfect 1992 Readers Choice

1-800-937-3279 EXT.10

LIFETIME ★ WARRANTY 100% GUARANTEED

MEMORY SUPER SOURCE

1x9 CALL
70NS SIMMS
4x9 CALL
CALL FOR LATEST SIMM PRICES

HARD DRIVES

Quantum

FACTORY NEW – 2 YEAR WARRANTY

CAPACITY M/N	SPEED	SIZE	PRICE
IDE			
80MB NOTEBOOK	19MS	3.5"	[illegible]
120MB NOTEBOOK	16MS	2.5"	329
160MB NOTEBOOK	16MS	3.5"	400
85MB ELS85A	17MS	3.5X1"	179
127MB ELS127A	17MS	3.5X1"	[illegible]
170MB ELS170A	17MS	3.5X1"	215
240MB LPS240A	16MS	3.5X1"	[illegible]
525MB LPS525AT	16MS	3.5X1"	640
SCSI			
85MB ELS85S	17MS	3.5X1"	199
127MB ELS127S	17MS	3.5X1"	215
170MB ELS170S	17MS	3.5X1"	220
240MB LPS240S	16MS	3.5X1"	315
525MB LPS525	10MS	3.5X1"	815
700MB PR700	10MS	3.5"	1040
1GB P1000S	15MS	3.5X1"	1000
1.2GB P1225S	10MS	3.5"	1180
PLUS Hardcard XXL	80MB		284
PLUS Hardcard XXL	180MB		560
PLUS Hardcard EZ	240MB		640
PLUS Hardcard EZ	127MB		315

FUJITSU

FACTORY NEW – 5 YEAR WARRANTY

IDE			
330MB M2622T	12MS	3.5"	429
425MB M2623T	12MS	3.5"	600
520MB M2624T	12MS	3.5"	779
SCSI			
425MB M2623FA	11MS	3.5"	740
520MB M2624FA	11MS	3.5"	796
1.2GB M2694SA	10MS	3.5"	1189
1.2GB M2266SA	14MS	FH	800
2.0GB M2652SA	11MS	FH	1679
2.4GB M2654SA	12MS	FH	1000

Maxtor

FACTORY NEW – FULL WARRANTY

IDE			
120MB 7120A	15MS	3.5X1"	199
170MB 717A	16MS	3.5X1"	229
213MB 7213A	15MS	3.5X1"	289
245MB 7245A	15MS	3.5X1"	289
345MB 7345A	15MS	3.5"	340
540MB 7540A	12MS	3.5"	679
SCSI			
120MB 7120S	15MS	3.5X1"	215
213MB 7213S	15MS	3.5X1"	229
345MB 7345S	12MS	3.5"	300
540MB MAXIKS540SL	8MS	3.5X1"	679
1.2GB 1340S	8MS	3.5"	1239
1.2GB PO12S	13MS	FH	679
1.7GB P1170	16MS	FH	1229

TOSHIBA

SUPER FAST SCSI			
677MB MK438FB	12MS	3.5"	679
1.2GB MK538FB	12MS	3.5"	1000
200MB IDE		3.5"	499
200MB SCSI		3.5"	600

MICROPOLIS

FACTORY NEW – 5 YEAR WARRANTY

IDE			
[illegible] 2105A	10MS	3.5"	[illegible]
1GB 3113A	10MS	3.5"	1079
SCSI			
340MB MC1684	15MS	HH	[illegible]
380MB MC2106	10MS	3.5"	500
670MB MC1624	14MS	HH	1000
600MB MC2106	10MS	3.5"	1030
1.2GB MC2113	10MS	3.5"	1000
1.2GB MC1866	15MS	FH	1000
1.5GB MC1936	15MS	FH	1079
1.5GB MC1906	11MS	FH	1740
1.75GB MC2217	10MS	3.5"	1740
2.0GB MC1848	14MS	FH	1730
2.4GB MC1924	11MS	FH	2379
3.0GB MC1936	11MS	FH	3000

Seagate

IDE			
42.8MB ST351A/X	19MS	3.5X1"	119
30MB ST3096A	15MS	3.5X1"	187
107MB ST3120	15MS	3.5X1"	199
130MB ST3144A	15MS	3.5X1"	199
85MB ST9096A	16MS	2.5"	199
314MB ST3243A	16MS	2.5"	235
120MB ST9144A	16MS	3.5"	579
245MB ST3283A	12MS	3.5X1"	600
290MB ST3290A	16MS	3.5X1"	279
340MB ST3385A	13MS	3.5X1"	679
209MB ST9235X	16MS	3.5"	430
482MB ST3550A	13MS	3.5X1"	480
331MB ST1400A	14MS	3.5X1"	600
430MB ST1480A	14MS	3.5X1"	700
540MB ST3600A	11MS	3.5X1"	729
SCSI			
240MB ST3283N	12MS	3.5X1"	619
331MB ST1400N	14MS	3.5X1"	600
425MB ST3500N	11MS	3.5X1"	729
430MB ST1480N	14MS	3.5X1"	780
457MB ST3550N	12MS	3.5X1"	799
425MB ST3600N	11MS	3.5X1"	815
518MB ST3390A	15MS	3.5X1"	840
535MB ST3610N	11MS	3.5X1"	839
900MB ST1980N	15MS	3.5X1"	800
570MB ST4766N	14MS	FH	1100
666MB ST4767N	11MS	FH	800
1420MB ST41550N	15MS	3.5X1"	1000
1380MB ST41600N	16MS	FH	1000
1.2GB ST11200N	10MS	3.5"	1000
1.2GB ST41200NK	15MS	FH	1000
1.8GB ELITE-I	11MS	FH	1000
1.4GB ST41651	15MS	FH	1430
2.1GB ST42100N	10MS	FH	1000
2100MB ST42400N	11MS	FH	2229
3.55GB ST43400N	10MS	FH	2939
3.4GB SLITE-II	11MS	FH	8000
3.4GB SLITE-III	11MS	FH	3000

WESTERN DIGITAL

FACTORY NEW – 2 YEAR WARRANTY

IDE			
80MB WD280	19MS	3.5X1"	109
170MB WD1170	15MS	3.5X1"	800
312MB WD2200	12MS	3.5X1"	600
280MB WD2230	14MS	3.5X1"	600
340MB WD2340	12MS	3.5X1"	600

CONNER

FACTORY NEW – 1 YEAR WARRANTY

IDE			
40MB CP3000	25MS	3.5X1"	109
80MB CP30084	19MS	3.5X1"	199
100MB CP30104H	19MS	3.5X1"	215
170MB CP30174E	17MS	3.5X1"	240
312MB CP30204	15MS	3.5X1"	318
800MB CP30304	15MS	3.5"	340
340MB CP3444	15MS	3.5"	340
640MB CP30644	17MS	3.5X1"	CALL
SCSI			
80MB CP30080	19MS	3.5X1"	199
170MB CP30175	17MS	3.5X1"	679
212MB CP30200	16MS	3.5X1"	329
340MB CP3644	12MS	3.5"	600

MATH CO-PROCESSORS

INTEL		CYRIX		IIT	
8087 5MHZ INTEL	40.00	83D87DX-16 16MHZ CYRIX	84.00	2C87-8 8MHZ IIT	54.00
8087-2 8MHZ INTEL	139.00	83D87DX-20 20MHZ CYRIX	84.00	2C87-10 10MHZ IIT	54.00
8087-1 10MHZ INTEL	89.00	83D87DX-25 25MHZ CYRIX	84.00	2C87-12 12MHZ IIT	60.00
80287-6 6MHZ INTEL	40.00	3D87DX-33 33MHZ CYRIX	84.00	2C87-20 20MHZ IIT	84.00
80287-8 8MHZ INTEL	40.00	83D87DX-40 40MHZ CYRIX	84.00	3C87-16 16MHZ IIT	84.00
80287-10 10MHZ INTEL	50.00	83S87SX16 16MHZ CYRIX	74.00	3C87-20 20MHZ IIT	84.00
80287XL 10MHZ INTEL	75.00	83S87SX20 20MHZ CYRIX	74.00	3C87-25 25MHZ IIT	84.00
80287XLT 12MHZ INTEL	75.00	83S87SX25 25MHZ CYRIX	74.00	3C87-33 33MHZ IIT	84.00
80387SX-16 16MHZ INTEL	85.00	82S87XL CYRIX	74.00	3C87-40 40MHZ IIT	94.00
80387SX-20 20 HZ INTEL	85.00	**WEITEK**		3S87SX-16 16MHZ IIT	70.00
80387DX-16 16MHZ INTEL	89.00	3167-20MHZ WEITEK	295.00	3S87SX-20 20MHZ IIT	70.00
80387DX-20 20MHZ INTEL	89.00	3167-25MHZ WEITEK	395.00	3S87SX-25 25MHZ IIT	70.00
80387DX-25 25MHZ INTEL	89.00	3167-33MHZ WEITEK	495.00	3S87SX-33 33MHZ IIT	80.00
80387DX-33 33MHZ INTEL	89.00	4167-25MHZ WEITEK	445.00		
80487SX-25 INTEL	CALL	4167-33MHZ WEITEK	695.00		
OVERDRIVE SX/DX33	CALL				
OVERDRIVE SX/DX25	CALL				
OVERDRIVE SX/DX20	CALL				
RAPID CAD	CALL				

SIMM-SIPP MODULES

4MB X 9-80NS SIMM-PC	CALL	256K X 9-100NS SIMM	CALL	1MB X 9-70NS SIPP	CALL
4MB X 9-70NS SIMM	CALL	256K X 9-80NS SIMM	CALL	1MB X 9-60NS SIPP	CALL
4MB X 9-60NS SIMM	CALL	256K X 9-70NS SIMM	CALL	256K X 9-100NS SIPP	CALL
1MB X 9-100NS 9 CHIP SIMM	CALL	256K X 9-60NS SIMM	CALL	256K X 9-80NS SIPP	CALL
1MB X 9-80NS 3 CHIP SIMM	CALL	1MB X 8-80NS SIMM	CALL	256K X 9-70NS SIPP	CALL
1MB X 9-80NS 9 CHIP SIMM	CALL	1MB X 8-70NS SIMM	CALL	256K X 9-60NS SIPP	CALL
1MB X 9-70NS 3 CHIP SIMM	CALL	4MB X 8-80NS SIMM	CALL	256 X 36 – 1MB	CALL
1MB X 9-70NS 9 CHIP SIMM	CALL	4MB X 8-70NS SIMM	CALL	512 X 36 – 2MB	CALL
1MB X 9-60NS 3 CHIP SIMM	CALL	1MB X 9-100NS SIPP	CALL	1 X 36 – 4MB	CALL
1MB X 9-60NS 9 CHIP SIMM	CALL	1MB X 9-80NS SIPP	CALL	2 X 36 – 8MB	CALL
1MB X 9-53NS 3 CHIP SIMM	CALL			4 X 36 – 16MB	CALL
1MB X 9-53NS 9 CHIP SIMM	CALL				
16MB X 9-70NS SIMM	CALL				

Apple

POWERBOOK 100, 140, 145, 170
2MB MOD M1032LL-A
4MB MOD M1033LL-A
6MB MOD N/A
POWERBOOK 160, 180
2MB MOD N/A
4MB MOD N/A
6MB MOD N/A
8MB MOD N/A
10MB MOD N/A
POWERBOOK 210, 230
NOTE: THERE ARE THREE TYPES OF MODULES FOR MODELS 210 & 230, "UPGRADABLE", "BASE" AND "CONVENTIONAL" BE SURE TO PURCHASE THE CORRECT ONE FOR YOUR NEEDS
CONVENTIONAL (STANDARD)
2MB MOD N/A
4MB MOD N/A
6MB MOD N/A
8MB MOD N/A
10MB MOD N/A
12MB MOD N/A
BASE - WILL ACCEPT 1 UPGRADE MODULE
4MB MOD N/A
8MB MOD N/A
12MB MOD N/A
20MB MOD N/A
UPGRADE MODULES - INSTALL ON THE BASE MODULES
4MB MOD N/A
8MB MOD N/A
16MB MOD N/A
MAC PORTABLE
2MB MOD N/A
3MB MOD N/A
4MB MOD N/A
MAC PORTABLE BACKLIT
2MB MOD N/A
3MB MOD N/A
4MB MOD N/A
8GI
1-4MB E-C N/A
MAC PLUS
2MB KIT M0219
4MB KIT M02707
MAC CLASSIC
1-3MB E-C M6361LL-A
2MB KIT M0219
MAC CLASSIC II, LC, LCII
2MB KIT M0219
4MB KIT N/A
6MB KIT N/A
MAC SE
2MB KIT M0219
4MB KIT M027007
MAC SE/30
4MB KIT M02707
16MB KIT N/A
MAC II
4MB KIT M02707
MAC IIX
4MB KIT M02707
16MB KIT N/A
MAC LC
2MB KIT M0219
4MB KIT N/A
8MB KIT N/A
512K VRAM
MAC IISI, IICI
2MB MOD M0514LL-A
4MB KIT M02707
16MB KIT N/A
32MB KIT N/A
64MB KIT N/A
MAC IIFX
4MB KIT M0376LL A
16MB KIT N/A
64MB KIT N/A
MAC IICX
4MB KIT M02707
16MB KIT N/A
32MB KIT N/A
MAC QUADRA 700, 900, 950
4MB KIT M02707
16MB KIT N/A
32MB KIT N/A
64MB KIT N/A
QUADRA VIDEO 700, 900
512K KIT M5951LLA
QUADRA VIDEO 950
512K KIT M593LLA
PERSONAL LASER WRITER LS
512K KIT 3340114
PERSONAL LASER WRITER NT
2MB KIT M0219
8MB KIT N/A
LASERWRITER NNT3, IINTXJ
1MB KIT M6005
4MB KIT M6006
LASERWRITER IIF/IIG
4MB KIT M02727
16MB KIT N/A
LASER WRITER IINTR
2MB
MAC IIVX
4MB KIT M0202LLA
16MB KIT N/A
32MB KIT N/A
64MB KIT N/A
CENTRIS 610, 650, LCIII
4MB 1507LLA
8MB NA
16MB M1508LLA
32MB NA
POWERBOOK 165C
4MB NA
8MB NA
8MB NA
10MB NA
LASERWRITER SELECT 310
1MB M2093GA
4MB M22094GA

ALR

ALR POWERFLEX
ALR FLEX CACHE 386SX
2MB KIT 12902000
4MB KIT 12904000

ALR BUSINESS VEISA
ALR BUSINESS VEISA ARRAY
ALR MPS
4MB KIT 12904000
16MB KIT 12916000
0-32MB E-C 12407480
ALR BUSINESS STATION
ALR POWER PRO
ALR POWER PRO ARRAY
ALR POWER PRO/MC
ALR POWER FLEX FLYER, 20CX
4MB KIT 12904000
16MB KIT 12918000
ALR POWER CACHE 486-486E
ALR MICROFLEX 3000
2MB KIT 12902000
4MB KIT 12904000
16MB KIT N/A
32MB KIT N/A
ALR FLYER 32LC1, 32DT, SD32
1MB 32LCT ONLY
4MB 12901804
16MB 12904816
RANGER SERIES
4MB MOD 12926010
8MB MOD 12926016
16MB MOD N/A
VENTURA NOTEBOOK 16 & 20
1MB MOD 12407960
4MB MOD 12407970

AST

AST PREMIUM EXEC 286/12, 386SX/20
1MB MOD 500814001
4MB MOD 500814003
AST PREMIUM EXEC. 386SX/25, 25C, 25SL, 25SLC
4MB MOD 500014004
BRAVO 286
2MB KIT 500510002
4MB KIT 500510008
BRAVO 486/25, 4-23
2MB KIT 500718004
6MB KIT 500790001
BRAVO 3-25S
2MBN KIT 500710004
8MB KIT 500824002
BRAVO 3-33LC
2MB KIT 500962001
8MB KIT 500962002
BRAVO 386SX
2MB KIT 500510002
4MB KIT 500510008
BRAVO 386SX20
2MB KIT 500710003
8MB KIT 500024001
BRAVO 425S, 433LC, 450D, 466D
ADVANTAGE PRO 486DX33, 486SX25
2MB KIT 500987001
4MB MOD 500987002
8MB KIT 500987003
16MB MOD 500987004
32MB KIT 500987005
PREMIUM & 386/25, /33, 386SX/20, 486/33, 486SX/20,
PREMIUM 386SX/16, 486/33E
PREMIUM 386/33TE, 486/33TE
1MB MOD 500780003
2MB KIT 500780005
4MB MOD 500780004
8MB KIT 500780001
0-32MB E-C 500819001
OFFICE ADVANTAGE 386SX/20, 486SX/20
2MB KIT 500891001
8MB KIT 500891002
PREMIUM 386
4MB 500510004
POWER PREMIUM 3/33, 4/33 & 4/50D
2MB KIT 500780005
8MB KIT 500780001
PREMIUM WKST 286, 386SX
2MB KIT 500510002
4MB KIT 500510008
PREMIUM 386/16, C
4MB KIT 500510008
PREMIUM SE 4/33
2MB KIT 500780005
8MB KIT 500780001
PREMIUM SE 4/50
16MB KIT 500928001
32MB KIT 500928002
PREMMIA
4MB 501159001
8MB 5011569002
16MB 501159003
32MB 501150004
MANHATTAN SMP
16MB 501143001
ADVANTAGE PLUS 486DX33
DX250 - DX286
4MB 500510008
8MB 500824001
AST POWER EXEC 4/25SL
4MB NA

hp

HP VECTRA 386/33N - 33NI
2MB D2714A
8MB d2715A
HP VECTRA 286/12, ES12PC
2MB KIT D1354A
0-16MB E-C
386/1AR, /20N
2MB KIT D2406A
8MB KIT D2404A
QS/16S, RS25PC, 20PC, 20C
2MB KIT D1354A

386/25PC, 486UPC
2MB MOD D2381A
8MB MOD D2152A
486U/20PC, 486PC, 486/25T, 486/331
1MB MOD D2150A
2MB MOD D2381A
4MB MOD D2156A
8MB MOD D2152A
9000/370, /380, 345, 400DL, 400S, 400T, 425S
8MB KIT H982298
16MB KIT H98229D
32MB KIT H98229E
9000/425T
4MB KIT H98229C
8MB KIT H982298
16MB KIT H98229D
9000/433S
4MB KIT H9229C
9000/425E
4MB KIT A2200A
8MB KIT A2201A
16MB KIT A2202A
9000/720, /730
16MB KIT A1979A
32MBN KIT A2512A
9000/750
16MB KIT A1979A
32MB KIT A1987A
9000/705, /710
8MB KIT A2216A
16MB KIT A2217A
32MB KIT A2218A
X-STATION 700RX
1MB MOD C2320A
2MBN MOD C2321A
4MB MOD C2322A
8MB MOD D2152A
DESKJET 500C, 500 PLUS, 550C
256KB MOD H227078
LASERJET II, IID
2-4 E-C H334448
4MB E-C H334458
LASERJET IIP, III, IIID, IIIP
2-4MB E-C H334758
3-4MB E-C H334768
4MB E-C H334778
LASERJET IIISI
4MB MOD C2065A
8MB MOD N/A
HP-4 - 4M - 4SI - 4SIMX - XL300
1MB C2063A
2MB C2064A
4MB C2065A
8MB C2066A
HP LASERJET F6S
1MB
PAINTJET XL300
0K EXP 6D
HP DESIGNJET 600 INKJET
4MB C2065A
8MB C2066A

TOSHIBA

T1000SE
1MB C-C PCPA8311U
2MB C-C PCPA8312U
T1000LE
1MB C-C PCPA8311U
2MB C-C PCPA8312U
4MB C-C PCPA2001U
8MB C-C PCPA2002U
T1000XE
1MB C-C PCPA8311U
2MB C-C PCPA8312U
T2000
1MB C-C PC18PA8316U
2MB C-C PC18PA8317U
4MB C-C PC1XPA8314U
8MB C-C PC1XPA8315U
T2000SX
4MB C-C PC14PA8314U
8MB C-C PC14PA8315U
T2000SXE, T2200SX, T1800, T1850, T1850C
2MB C-C PCPA2000U
4MB C-C PCPA2001U
8MB C-C PCPA2002U
T3300SL
2MB C-C PCPA2006U
4MB C-C PCPA2007U
6MB C-C PCPA2008U
8MB C-C PCPA2009U
16MB C-C PCPA2010U
T4400SX, T4400SXC, T6400-C
2MB C-C PCPA2003U
4MB C-C PCPA2004U
8MB C-C PCPA2005U
16MB C-C PCPA2010U
32MB C-C N/A
T1200XE
2MB MOD PC13PA8306U
T1600
2MB MOD PC8PA8302U
T3100
2MB MOD PC3PA7135E
T3100E
2MB KIT PC9PA8341U
T3100SX
2MB MOD PC15PA8308U
4MB MOD PC15PA8310U
T3200
3MB MOD PC8PA7137U
T3200SX
2MB KIT PC12PA8307U
4MB KIT PC12PA8309U
T3200SXC
2MB KIT PC19PA8318U
4MB KIT PC19PA8319U
T5100, T8100C
2MB MOD PC7PA8301U
T5200, T5200C, T8500
2MB KIT PCPA8304U
8MB KIT PCPA8313U

T4500, T4500C
4MB C-C PCPA16U
8MB C-C PCPA2017U
16MB C-C N/A
PAGELASER 6
2-4MB E-C NB0090
4MB E-C NB0100

AT&T

SAFARI NSX/20
2MB C-C 37650
4MB C-C 37651
6286WGS
2MB KIT 37727
6386, 6738GEWGS
4MB KIT 37716
6386/SX
2MB KIT 37338
0-16MB E-C N/A
6386/25, /33WGS
2MB KIT 37261
STAR SERVER 486/33E
4MB KIT 37261
16MB KIT 37263
STAR SERVER 486/33S
4MB KIT 37344
16MB KIT 37345

NEC

ULTRALITE 286F
1MB MOD PC2221
4MB MOD PC2222
ULTRALITE SX/20
2MB MOD PC4421
8MB MOD PC4422
ULTRALITE SL/20, SL/20P
6MB MOD PC4921
ULTALITE III, SL25C
2MB MOD PC4721
4MB MOD PC4722
8MB MOD PC4723
PROSPEED 286
1MB MOD PC2121
2MB MOD PC2126
4MB MOD PC2122
PROSPEED 386
2MB MOD PC3121
8MB MOD PC3122
PROSPEED 386SX
1MB MOD PC2121
2MB MOD PC2126
4MB MOD PC2122
PROSPEED 386SX/20
1MB MOD PC4321
4MB MOD PC4322
PROSPEED 486SX, 486SX/C
1MB MOD OP4106204
4MB MOD OP4106205
POWERMATE PORTABLE SX
2MB E-C APCH751X
8MB E-C APCH753-754
POWERMATE PORTABLE PLUS
1-3MB E-C APCH750J
2-3MB E-C N/A
3MB E-C N/A
POWERMATE 386/16, /20
4-16MB E-C N/A
8-16MB E-C N/A
POWERMATE SX
2MB E-C APCH655
4-8MB E-C APCH853
8MB EC N/A
POWERMATE SX PLUS
2MB E-C N/A
4-8MB E-C APC852E
8MB E-C N/A
POWERMATE SX/16
2-8MB E-C OP4108201
2MB KIT N/A
POWERMATE SX/20
2MB CPU MODULE OP4108101
2-8MB E-C OP4100102
2MB KIT N/A
POWERMATE SX/16I, SX/20I, SX/20VI
2MB KIT OP4108103
8MB KIT OP4102101
POWERMATE 286C, 286 PLUS
1-3MB E-C APCH250K
2-3MB E-C N/A
3MB E-C N/A
POWERMATE 386/20
2MB MOD APCH655E
8MB MOD APCH656E
POWERMATE 386/25, 386SX25
2MB MOD APCH655X
8MB MOD APCH656X
8MB 8MB APCH657X
POWERMATE 386/25S
2MB KIT OP4105701
4MB KIT OP4105203
8MB KIT OP4105207
POWERMATE 386/33E, 486/25E
2MB MOD OP4105101
POWERMATE 486/33I
1MB MOD OP4106204
4MB MOD OP4106205
16MB MOD OP4106206
POWERMATE 486/33I
2MB KIT OP4100103
8MB KIT OP4102101
POWERMATE EXPRESS
486/33E, /50E
486SX/20E, /25E
POWERMATE EXPRESS TOWER
486/25TE, /33TE, /50E
486/SX25TE
1MB MOD OP4106204
4MB MOD OP4106205
16MB MOD OP4106206
SILENTWRITER MODEL 90 & 290
2MB MOD OP4892
SILENTWRITER MODEL 95
2MB MOD 9502
SILENTWRITER MODEL Z
2MB MOD 4892

CALL FOR LATEST SUPER PRICES

COMPAQ

LTE 8088 PROCESSOR
512K MOD 117077001
LTE 286
1MB KIT 117081001
2MB KIT 117001002
4MB KIT 117081003
LTE 386S/20
4MB C-C 121125002
LTE LITE 20, 25
2MB C-C 129769001
4MB C-C 129769002
8MB C-C 129769003
16MB C-C N/A
SLT/286
1MB MOD 110235001
4MB MOD 110237001
SLT 386S/20
4MB MOD 118305001
PORTABLE III
2MB KIT 107332001
INTERFACE 107808001
EXP BOARD 107011001
PORTABLE 386
1MB KIT 107651001
INTERFACE 107707001
4MB E-C 107653001
4MB AOM 107654001
PORTABLE 486C
2MB MOD 118689001
4MB MOD 118690001
8MB MOD 126877001
DESKPRO 286
2MB KIT N/A
0-16MB E-C N/A
DESKPRO 286E
2MB KIT N/A
0-16MB E-C N/A
DESKPRO 386-16
1MB KIT 106071001
1MB E-C 108069001
2MN E-C 108069-71-001
4MB E-C 108070001
8MB E-C 108070-72-001
DESKPRO 386S
1MB E-C 113633001
4MB E-C 113634001
1MB MOD 113646001
4MB MOD 112534001
DESKPRO 386/20E, /25E
1MB E-C 113644001
4MB E-C 113645001
1MB MOD 113131001
4MB MOD 113132001
DESKPRO 386/33
2MB MOD 115144001
DESKPRO 386/33L, 486/33L
2MB MOD 115144001
8MB MOD 116561001
32MB MOD 116568001
6 SOCK-EC 116569001
DESKPRO 486/25, /SCL
2MB MOD 115144001
8MB MOD 116561001
32MB MOD 116568001
DESKPRO 386/25M, 486/33M, 486S/16M, /25M
1MB MOD 118688001
2MB MOD 118689001
4MB MOD 118690001
8MB MOD 126877001
8 SOCK-EC 129180001
DESKPRO 20AR, 386N, 386S/20N
1MB MOD 118688001
2MB MOD 118689001
4MB MOD 118690001
3 SOCK-EC 118700001
PROLINEA 3/25S, 3/25ZS
2MB KIT 141738-001
8MB KIT 141742-001
PROLINEA 4/33, 4/66I
1MB MOD 141682-001
2MB MOD 141683-001
4MB MOD 141684-001
8MB MOD 141685-001
SYSTEMPRO
2MB MOD 115144001
8MB MOD 116561001
32MB MOD 116568001
6 SOCK-EC 116569001
SYSTEMPRO/LT 386-25S, 486SX-25S
1MB MOD 118689001
2MB MOD 118689001
4MB MOD 118690001
8MB MOD 126877001
8 SOCK-EC 129160001
CONTURA 3/20, /25
2MB MOD 139492001
4MB MOD 139498001
8MB MOD 139499001
CONTURA 4/25
4MB MOD 146520001
8MB MOD 146521001
16MB MOD 146522001
DESKPRO M-SERIES
SYSTEMPRO LT 486SX/25S & 325/25SE
2-64MB BD 129160 + 689
4-64MB BD 129160 + 690
8-64MB BD 129160 + 877
SYSTEMPRO/XL
16MB KIT 136818001
32MB KIT 136817001
176MB KIT 139918001
8 SOCK-EC 139938001
PROSIGNIA
1MB MOD 118688001
2MB MOD 118689001
4MB MOD 118690001
8MB MOD 128677001
16MB MOD 139917001
32MB MOD 149147001
LTE 4/25C
2MB CRD 142337002
4MB CRD 142337003
8MB CRD 142337004

SUN

SPARCSTATION ELC
4MB MOD X104D
16MB MOD X116D
SPARCSTATION IPC
4MB KIT X104Y
16MB KIT X116Y
SPARCSTATION IPS
4MB MOD X104U
16MB MOD X116U
SPARCSTATION 2
16MB KIT X116W
SPARCSTATION 330
8MB KIT X108E
32MB KIT X134A
SPARC 1, 3/60, 80, 4/40, 60, 65
4MB KIT X104C,G,H Y
SPARC SLC (4/20)
4MB MOD X105Z
4/110
16MB KIT X116D
SPARC 8, 4/40, 60, 65, 20, 330, 370, 390
16MB KIT X116H Y WD
4/330, 4/370, 4/390
8MB KIT X108E
32MB KIT N/A
SPARC10
16MB MOD X116F
64MB KIT X164F
SPARCSERVER 630MP, 670MP, 690
64MB KIT X1684

EVEREX

TEMPO LX, LX20
2MB MOD N/A
TEMPO CARRIER
2MB MOD N/A
TEMPO 286
2MB KIT N/A
TEMPO 386SX
2MB KIT N/A
4MB KIT N/A
STEP SERIES 286-12, -16, -20, 386-16 & 20
2MB KIT N/A
4MB KIT N/A
STEP SYSTEMS 386/0, 386SX/20
4MB KIT N/A
8MB KIT N/A
16MB KIT N/A
386/25, /33, SERVER 386, 486/33, 486SX/20, 486EISK, SERVER 486
4MB KIT N/A
16MB KIT N/A

IBM

R510X & R51SLC
2MB MOD 07G1879
4MB MOD 07G1860
8MB MOD 07G1881
L40SX, N33SX LAPTOP
2MB MOD 79F0999
4MB MOD 79F1000
8MB MOD 79F1001
P75 & P70
2MB MOD 6450902
4MB MOD 6450128
PS/1 286
512K MOD 1057035
2MB MD 92F9935
PS/1 386SX
512K MOD 1057035
2MB MOD 92F9935
4MB MOD 92F9694
PS/2 25
128K KIT 78X8955
PS/2 25 & 30 286
512K KIT 30F5348
2MB KIT 30F5360
0-16MB E-C N/A
PS/2 55SX, 35LS, 40SX
1MB MOD 6450603
2MB MOD 6450604
4MB MOD 87F9977
8MB MOD 6450129
PS/2 95SX & 56LS
1MB MOD 6450603
2MB MOD 6450604
4MB MOD 87F9977
0-16MB E-C
PS/2 57SX, 857SLC, 80SX, 565LC, 76 & 77
2MB MOD 6450902
4MB MOD 6450128
8MB MOD 6450130
PS/2 70-061, 70-161, 121, 081, E61
1MB MOD 6450603
2MB MOD 6450604
0-32MB E-C
PS/2 70-A51, -A16, -A21, -A81, B61, B21
2MB MOD 6450608
0-32MB E-C
PS/2-90 A16, A21, A51
4MB MOD 6451060
0-32MB E-C
MODEL 90XP & 95X
INSTALL IN PAIRS
2MB MOD 6450902
4MB MOD 645012X
8MB MOD 6450130

16 BIT EXPANSION CARD FOR MODELS 50, 60 55SX, 65SX, 55LS MAXIMUM TWO CARDS PER MACHINE
0-16MB E-C
1MB MOD 6450603
2MB MOD 6450604
4MB MOD 87F9977
8MB MOD 6450129
32 BIT EXPANSION CARD FOR MODELS 70 & 80 MAXIMUM TWO CARDS PER MACHINE
0-32MB E-C
1MB MOD 6450603
2MB MOD 6450604
4MB MOD 87F9977
8MB MOD 6450129
4019 & 4019E
3.5MB E-C 1038675
4029
4MB MOD 118335
THINKPAD 300
2MB CRD33G9268
8MB CRD33G2989
THINKPAD 700T
8MB RCD6451167
THINKPAD 700 & 700C
2MB MOD071419
4MB MOD07G1420
8MB MOD07G1421
N45SL
2MB MOD92F8804
CL57SX LAPTOP
2MB CR007G1419
4MB CR007G1420
8MB CR007G1421
PS/1 CONSULTANT 2133, G11, G1S, G14, ESSENTIAL W11, W13, W14, VALUEPOINT 325T & EXPERT S11, S13, S14
1MB MOD6450603
2MB MOD6450608
4MB MOD6450128
8MB MOD6450130
VALUEPOINT 425SX25, DX/33 & DX2/66 INSTALL IN FOURS
1MB MOD96F9260
4MB MOD96F9291
PRO 386SX M21-23
2MB MOD6450902
4MB MOD6450128
8MB MOD6450130
PS/2 80-041
1MB MOD6450375
PS/2 80-081, 111, 121, 1S1, 311 & 321
2MB MOD6450379
MODEL 95-00 DME, DMT ECC MODULES
4MB MOD6451158
8MB MOD6451159
XSTATION 120 & 130
1MB VRAM4201
1MB MOD6450603
2MB MOD6450604
4MB MOD34F2933
RS/6000 POWERSTATION POWERSERVER 220
4MB MOD6450128
8MB MOD6450130
RISC SYSTEM 6000
NO BOARD INCLUDED
16MB KIT 401D
32MB KIT 4033
64MB KIT 4036
PS NOTE
4MB N/A
8MB N/A

SILICON GRAPHICS

40/100 & /120, 40 SERIES 200, 300, 400
8MB KIT H4C08X
32MB KIT H4D32K
40/20 PERSONAL IRIS, 4020, 4040, 4050, 4070, 4080, 4005, CS/12, TURBO 12 & 16
4MB KIT H4C058
40/20 & 25
16MB KIT HU1C150
IRIS CRIMSON
16MB KIT H4C16X
64MB KIT N/A
40/RX, INDIGO RPC, PERSONAL IRIS & IRIS INDIGO
8MB KIT HUC08C
32MB KIT HUC32H

ACER

ANYWHERE 1120NX
2MB CARD 1120NX
ANYWHERE X386S, X386S1
2MB CRD N/A
4MB CRD N/A
1100NX, 1100LS
4MB KIT N/A
1100 16SX
2MB KIT N/A
4MB KIT N/A
1100/20
2MB KIT 9100023008
1100/25, 33
4MB KIT 9100023004
1170, 1172, 1173, POWER 386
2MB MOD 9148623002
4MB MOD 9148623003
8MB MOD 9148623004
1200
4MB KIT 9148623002
8MB KIT 9148623003
16MB KIT 9148623004

PRINTER MEMORY

FUJITSU RX 7100, 7200N
2MB
KONICA LP3110, 3115
1MB
2MB
3MB
KYOCERA F1200S, F3300, F3300A
1-2-3-4MB
KYOCERA F820, E1000, F1000A, F3000A, F5000
1MB
CITON-4 PLUS + 8E
1MB
CITON CI-6
1MB
2MB
4MB
CITON CI-8
1MB
2MB
COMPAQ
PAGEMARQ 15 & 20
DATAPRODUCTS LZR650
EPSON EPL 4000, 4100, 6000, 8100
PAINTJET XL300
HP LASERJET EAR
PACKARD BELL PB9500
AT&T 593
TEC 1305B, 1321C, 1323D
FACIT P6060
NCR 6435
CITOH CI-5
HARRIS/3M
ATARI SLM-804PCV
D6SYS
MANNESMAN TALLY 905-906
PHILLIPS NMS 1480
IBM 4079
KYOCERA S/600A1
NEC SILENTWRITER 2/560, 560P, 562P R95
SEIKOSHA DP104, DP100
OLIVETTI PG108, PG208
SHARP JX9700, -E, -H
QMS PS810, PS1700, 825MR
OKIDATA OL810 & 410

DELL

320N, 212N, 320NPLUS
1MB MOD 3133203
2MB MOD 3103204
NL20, NL25
2MB MOD 3103213
325P, 325D, 333D, 333P, 325SX, 433P, 486D, 466P
1MB MOD 3102505
4MB MOD 3102507
466D, 466P
16MB MOD 3102625
420, 425, 433, 486
466DE, 466SE, 466TE
2MB KIT 3102466
4MB KIT 3102467
8MB KIT 3102468
TE & SE ONLY
16MB KIT 3102469
32MB KIT 3102630
NOTEBOOK 325NC, 325N
2MB
433E & 425E
2MB KIT 3102389
4MB KIT 3102390
6MB KIT N/A
316SX
2MB KIT 3102349
325N, NC NOTEBOOK
2MB MOD 3103210
PERFORMANCE T, L, M, SERIES
4MB 3103325
16MB 3103327
PERFORMANCE ME SERIES
4MB 3103334
8MB 3103335
16MB 3103336
32MB 3103337

MAGNAVOX

NOTEBOOK METALIS 286, 386SX
4MB MOD
NOTEBOOK METALIS 386SX16 & 386SX20
2MB MOD N/A
4MB MOD N/A
HS500, 300, 386SX, 286
2MB KIT
4MB KIT
HS, PR, MX 1200, 286, HS, PR, MA 1000, MOP160, PRO4CD, 386SS-16, HS, PRSX20, HS80CD 386-20SX, HS3300, 386-33
HS486, 486SX
1MB SIMM
4MB SIMM

Canon

LP8-4, -4PLUS, 4LITE
1MB MOD S632240
1-2MB E-C S632230
2MB E-C N/A
LBP-8III
1-4MB E-C S631300
2-4MB E-C S631600
3MB E-C S631300
LSP-8III, -8PLUS
1-3MB E-C S632340
2-3MB E-C S632350
3MB E-C S632360

TI

TRAVELMATE WINSLC/25
2MB 256679960001
TRAVELMATE 2000
1MB 2568034001
TRAVELMATE 3000
TRAVELMATE 3000WINSX
2MB KIT 2566779001
TRAVELMATE 4000WINSX
4MB MOD 25812650001
MICROLASER PLUS, XL
MICROLASER PLUS TURBO
1MB MOD 255739001
2MB KIT N/A
4MB KIT N/A
6MB KIT N/A

EPSON

NB-SL/20, /25, /25C
2MB MOD A808771
4MB MOD A808781
6MB MOD N/A
NB3S
4MB MOD A808511
EQUITY LT-286
1MB MOD A808191
EQUITY LT-386SX
2MB MOD A808361
EQUITY 286 PLUS
2MB KIT A808101
EQUITY 386SX/16 PLUS
2MB KIT A808101
EQUITY 386/25 PLUS, 386SX PLUS
2MB KIT A808101
EQUITY 386SX/20 PLUS
6MB KIT A808531
EQUITY 486SX/25 PLUS
2MB KIT A808101
486/33, EISA & TOWERS
2MB KIT A808591
8MB KIT A808711
16MB KIT A808673
EPL 6000 L-P
2-4MB E-C IBS401
4MB E-C N/A
EPL 7000 L-P
2-4MB E-C C822011
4MB E-C C822061
EPL 7500 L-P
2-4MB E-C C822051
4MB E-C C822021
ACTION LASER II/EPL 4000/4100/8000/8100
1MB E-C
2MB E-C
3MB E-C
5MB E-C
EQITY 2 PLUS

ZENITH

MASTERSPORT 286
1MB MOD ZA2121
MASTERSPORT 386SX
2MB MOD ZA3601
MASTERSPORT386SL, 386SLE
2MB MOD ZA44
SLIMSPORT
1MB MOD ZA18095
2MB MOD ZA18064
4MB MOD ZA16071
TURBOSPORT 386
1MB MOD ZA3034ME
TURBOSPORT 386E
1MB MOD ZA3034ME
4MB MOD ZA3035ME
SUPERSPORT 286
1MB MOD 18066
SUPERSPORT 286E
1MB MOD ZA18066
2MB MOD ZA18064
4MB MOD ZA18071
SUPERSPORT SX
2MB MOD ZA18064
2MB MOD ZA18088 ALPHA
2MB MOD ZA18087 BETA
Z-286LP PLUS
2MB KIT Z6051
0-16MB E-C N/A
Z-386SX, Z-386SX/20
2MB KIT Z6051
0-16MB E-C N/A
Z-386/20, /25, /33, /33E
1MB MOD Z3800ME
4MB MOD Z3800MK
Z-486/33ET
4MB KIT ZA4200MZ
16MB KIT ZA4200MB
Z-300 400 SERIES, Z-420SX
Z 425SX Z-433DX Z-433SX
4MB ME100
16MB ME90
Z-SERVER 425SX, 433DE, 450DE
4MB ME432
8MB ME102
16MB ME442
32MB ME92
Z-STATION 325SH - 325SN
420SEH - 420SH - 420SN - 425SH
433DEH - 433DH - 450XEN
1MB MR70
4MB ME100

brother

HL-4, 4V, 4PS
1MB E-C MB410
2MB E-C MB420
4MB E-C MR440
HL-8, -8E, -8D, -8V
1MB E-C MB810
2MB E-C MB820
BROL1-410, BROL2-420
1MB KIT N/A
HL10DV, 10PS
2MB E-C N/A
4MB E-C N/A

LAPTOP & NOTEBOOK

ALTIMA LAPTOP 6S
1MB MOD
2MB MOD
4MB MOD
16MB MOD
BONDWELL B310 SUPERSLIM
1MB MOD
BONDWELL B310V-B310SX
1MB MOD
4MB MOD
CHICONY 386SX
4MB MOD
CHICONY 5620
4MB MOD
CHAPLET NOTEBOOK
2MB MOD
4MB MOD
COMMODORE C286/386LT
2MB MOD
COMMODORE C386
2MB MOD
GOLDSTAR GS520 386SX/16
4MB MOD
HEWLETT PACKARD 95LX
1MB MOD
2MB MOD
HYUNDAI 386SX, NB386SC
4MB MOD
LIBREX 286 & V386SX
2MB MOD
LEADING EDGE OLT/386SX
1MB MOD
MITSUBA NINJA 286, 386SX
4MB MOD
PACKARD BELL PB286NB
4MB MOD
PACKARD BELL PB386NBX
4MB MOD
POQUET
512K MOD
1MB MOD
SAMSUNG NOTEMASTER 386S-16
2MB MOD
4MB MOD
SAMSUNG NOTEMASTER 386S-20, 386S-25
2MB
4MB
6MB
SANYO 1700, 1800, 18NB6
2MB MOD
SAMPO NBSX16
1MB MOD
2MB MOD
4MB MOD
SAMPO NBSX25
2MB MOD
4MB MOD
TANDON NB386SX
1MB MOD
4MB MOD
8MB MOD
TANDY 15/16, 20/16, 30/16
1MB
TANDY 26/25, 30/20
2MB
6MB
TULIP LAPTOP
4MB MOD
ZEOS NOTEBOOK
2MB MOD

OKIDATA

OL 400
1MB E-C 20014701
2MB E-C N/A
OL 800, 820
1MB E-C 70015201
2MB E-C N/A
3MB E-C N/A
4MB E-C N/A
OL 830, 840
2MB E-C 70016501

SHARP

PC 6220
1MB MOD CE6210
JX9600PS LASER
1MB E-C JX95MJ
JX9600E, 9600H, 9700
1MB C-C N/A
1.5MB C-C N/A
2.5MB C-C N/A
4MB C-C N/A

QMS

QMS-PS 810
1-4MB E-C N/A
2-4MB E-C N/A
4MB E-C N/A
QMS 815, 815MR, 818
1-6MB E-C N/A
2-6MB E-C N/A
4-6MB E-C N/A
6MB E-C N/A

Panasonic

CF-480
2MB MOD NA
6MB MOD NA
CF-170, CF-270, CF-370
1MB MOD CFBA165
4MB KIT N/A
KX-P4410, KX-P4420, KX-P4430
1-4MB E-C KXP443
2-4MB E-C KXP441
3-4MB E-C N/A
4MB E-C N/A
KX-P4400
1MB E-C KXP440
KX-P4400I
1-4MB E-C KXP443
2-4 MB E-C KXP441
3-4MB E-C N/A
4MB E-C N/A
KX-P4455
2MB E-C KXP4455 2

LOCAL BUS MOTHER BOARDS

386/486
ONE BOARD SOLUTION
386/486-64K Cache no CPU $200
386/486-256K Cache no CPU $250

386DX-33-64K CACHE W/CPU	$199
386DX-33-256K CACHE W/CPU	249
386DX-40-64K CACHE W/CPU	210
386DX-40-256K CACHE W/CPU	260
486SX-25-64K CACHE W/CPU	349
486DX-33-64K CACHE W/CPU	490
486DX-33-256K CACHE W/CPU	540
486DX-50-256K CACHE W/CPU	749

EXPANSION BOARDS

RAMpAT!™ Uses up to 16 MB of memory 16-bit ISA (PC AT) bus compatible Self-installing no switches or software setup required Supports extended or LIM 4.0 expanded memory modes $108

RAMpAT!-Plus™ Up to 16MB of memory Half-card plugs into 8-bit or 16-bit ISA expansion slots Hardware support for LIM 4.0 expanded memory Self installing software $145

AST Rampage Plus /2MB $169

DYNAMIC RAMS

1MB X 1-100NS	4.45	256 X 1-80NS	2.30	64K X 4-120NS	2.25
1MB X 1-80NS	4.70	256K X 1-70NS	2.30	64K X 4-100NS	2.60
1MB X 1-70NS	4.75	256K X 1-60 NS	2.70	64K X 4-80NS	2.75
1MB X 1-60NS	5.20	256K X 4-100NS	4.85	64K X 1-150NS	2.00
256K X 1-150NS	2.00	256K X 4-80NS	4.95	64K X 1-120NS	2.25
256K X 1-120NS	2.05	256K X 4-70NS	5.00	64K X 1-100NS	2.45
256K X 1-100NS	2.20	256K X 4-60NS	5.25		
1 x 4-80NS DIPP		25.00			

CACHE

8 X 8-15	[illegible]
32 X 8-15	18.00
8 X 8-25	4.00
32 X 8-25	7.00
64 X 4-25	[illegible]
16 X 4-25	6.00
8 X 8-20	4.00
32 X 8-20	[illegible]
64 X 4-20	10.00
16 X 4-20	[illegible]
16 X 4-15	[illegible]
64 X 1-20	18.00
64 X 1-15	20.00

FOR MEMORY PRODUCTS NOT LISTED, CALL FOR PRICES AND AVAILABILITY 636679

PURCHASE ORDERS FROM GOVERNMENT AGENCIES - UNIVERSITIES - FORTUNE 2000 FIRMS - CALL 1-800-MEMORY-2

ALL CREDIT CARDS ARE VERIFIED FOR FRAUDULANT USE NEVER A SURCHARGE ON CREDIT CARDS OPEN SATURDAY 10 – 6 ALL CREDIT CARDS ARE VERIFIED FOR FRAUDULANT USE

TECHNICAL SUPPORT 1-215-922-4640 — ORDERS ONLY TOLL FREE 1-800-457-6937 — FAX 1-215-922-0116

ALL CREDIT CARDS ARE VERIFIED FOR FRAUDULANT USE.

ORDER TOLL-FREE FROM ANYWHERE IN THE USA OR CANADA. CALL FOR CURRENT PRICES AND VOLUME DISCOUNTS. PRICES AND AVAILABILITY SUBJECT TO CHANGE. ORDER LINES OPEN 6 DAYS. MINIMUM ORDER 50.00•USA SHIPPING & HANDLING AIR $12.00–AIR OVERNIGHT $18.00–COD ADD $4.00•PA RESIDENTS ADD 7% SALES TAX•PREPAID ORDERS CALL FOR CONFIRMATION•ALL RETURNS REQUIRE RMA# AND ORIGINAL INVOICE CANCELLED ORDERS AND RETURNS FOR CREDIT SUBJECT TO 25% RESTOCKING CHARGE•RETURNED MERCHANDISE MUST BE IN NEW CONDITION AND RECEIVED WITHIN 14 DAYS FROM INVOICE DATE, SORRY, NO REFUNDS AFTER 14 DAYS. SHIPPING AND HANDLING CHARGES NOT REFUNDABLE•INTERNATIONAL ORDERS WELCOME–APO–FPO ORDERS WELCOME P.O.'S ACCEPTED FROM GOVERMENT AGENCIES/UNIVERSITIES/FORTUNE 2000 COMPANIES–SUBJECT TO APPROVAL ALL MEMORY PRODUCTS ARE THIRD PARTY. ALL TRADEMARKS ARE THE PROPERTY OF THE RESPECTIVE OWNERS ★ ALL WORLDWIDE TECHNOLOGY PRODUCTS ARE 100% GUARANTEED AND COME WITH LIFETIME WARRANTY EXCEPT 30 DAY WARRANTY ON CPU CHIPS AND 1 YEAR WARRANTY ON MOTHER BOARDS ★

WORLDWIDE TECHNOLOGIES 437 Chestnut Street, Philadelphia, PA 19106 Customer Service 215-922-4640

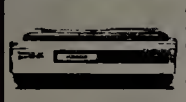
Circle 238 on reader service card

EPSON *ActionLaser 1500*

- 6 PPM
- 1MB
- 14 resident fonts
- 2-YR Warranty

$639.95

Panasonic *KX-P2124*



- 320 CPS draft
- 106 CPS LQ
- Extremely low noise
- 2-YR Warranty

$289.95

With Color....$329.95

Panasonic *KX-P4410*

- 5 PPM
- 28 fonts
- 300 X 300 dpi
- 512K RAM
- 1-YR Warranty parts & labor

$539.95

Other PANASONIC Printers

KX-P4410 Laser	$539.95
KX-P4430 Laser	$629.95
KX-P4440 Laser	$1059.95
KX-P4451 Laser	$1319.95
KX-P4455 Laser	$1639.95

OKIDATA *400 LED*

- 4 PPM
- 512K RAM
- 17 fonts
- 300 X 300 dpi

Rebate ens 7/31/93

~~$449.95~~*

*We will not be undersold

Other OKIDATA Printers

810	LED	$889.95
830+	LED	$1074.95
850	LED	$1199.95
400E	LED	NEW
410	LED	NEW

Laser Printers

IBM® Laser Printers

IBM laser 4019E	$769.95
IBM laser 4029/6IS	$994.95
IBM laser 4039/10D	$1929.95
IBM laser 4039/10R	$1394.95
IBM laser 4039/12R	$1789.95
IBM laser 4039/12L	$2539.95
IBM laser4039/16L	$2889.95
IBM 4070 portable	$349.95

Full line of accessories available.

Dot Matrix Printers

PANASONIC

1150	$124.95
3123	$269.95
3124	$323.95
3624	$377.95
2180	$149.95
2180 Color	$185.95
2023	$185.95
2123	$224.95
2123 Color	$259.95
2124	$289.95
2124 Color	$329.95
2624	$345.95
1124i	$235.95
1624	$319.95
1654	$509.95

CITIZEN

GSX-190	$159.95
GSX-190 Color	$199.95*
GSX-230	$239.95
GSX-230 Color	$265.95*
GSX-240	$289.95
GSX-240 Color	$315.95*
GSX-145	$359.95
200GX-15	$319.95

*Quanities Limited

STAR

NX-1001	$129.95
NX-1040 Color	$155.95
NX-2420 Color	$274.95
NX-2430	$217.95
XR-1020	$319.95
XR-1520	$399.95
XB-2420	$435.95
XB-2425	$545.95

EPSON

AP-3250	$179.95
FX-870	$279.95
LQ-570+	$238.95
LQ-1070+	NEW
FX-1170	$359.95
LQ-870	$449.95
LQ-1170	$615.95
LQ-2550	$895.95
Stylus 800 Inkjet	$324.95

If you don't see your product, please call.

OKIDATA

184 I Turbo	$210.95
380	$204.95
520/521	$359.95/479.95
320i	$292.95
321	$415.95
395 +	$945.95
395 C	$999.95
3410	$1179.95
590 Post-Net/ Bar Code	$415.95
591 Post-Net/ Bar Code	$565.95

Mannessmann Tally

MT151/9 parallel 9-pin	$459.95
MT150/24 parallel 24-pin	$589.95
MT151/24 parallel 24-pin	$619.95
MT350/24 par./ser. 24-pin	$1649.95
MT360 par./ser. 24-pin	$1939.95
MT645 line printer	$4299.95
MT690 line printer	$6999.95
MT691 line printer	$6999.95

SEAGATE Hard Drives

MODEL	SIZE	SPEED	TYPE	PRICE
3½" 1 Inch High:				
ST-351AX	42 Meg	28MSEC	IDE/AT	$99.95
ST-3144A	130 Meg	16MSEC	IDE/AT	$169.95
ST-3290A	260 Meg	16MSEC	IDE/AT	$249.95
ST-3390A	341 Meg	12MSEC	IDE/AT	$329.95
5¼" Full Heights:				
ST-41200N	1050 Meg	16.5MSEC	SCSI	$979.95
ST-42100N	1900 Meg	12.9MSEC	Fast SCSI-2	$1399.95

Maxtor Hard Drives

MODEL	SIZE	SPEED	TYPE	PRICE
3½" 1 Inch High:				
7213A	213MB	15MS	IDE/AT	$215.95
7245A	245MB	15MS	IDE/AT	$225.95
7345A	345MB	14MS	IDE/AT	$299.95
540SL	540MB	8.5MS	SCSI-2	$799.95
5¼" Full Heights:				
1240S	1240MB	8.5MS	SCSI-2	$1099.95

Hard Drives

Maxtor 7345A Hard Drive

345 MB

IDE/AT

$299.95

HOURS

Sales: Mon. - Fri. 9 - 9 EST. Sat. 10 - 6 EST.

800-233-8760 or 717-494-1030

Fax: 717-494-1441

Customer Service:

Mon. - Fri. 9 -5 EST.

717-494-1670

COLORADO

Jumbo 120	$145.95
Jumbo 250	$164.95
Trakker 120	$285.95
Trakker 250	$319.95
External kit for 120 & 250	$CALL
DC 2120 blank tape cartridges	$18.95
PT-25 2 Gigabyte	$939.95
PT-50 Gigabyte	$1489.95

CONNER

C250MQ	$159.95

Tape Back-Ups

COLORADO MEMORY SYSTEMS INC Trakker 250 Tape Back-Up

250 MB

$164.95

POLICY

Why shop at Lyco Computer? Lyco Computer offers quality name brand computer products at prices 30% to 50% below retail. If you do not see the product you want advertised, call Lyco Marketing toll free. *How do I know I will get the product I need?* Our marketing staff receives continuous formal training by our manufacturers. Though our strict guarantee on providing only new merchandise prohibits free trial periods and a guarantee on compatibility, a wealth of knowledge is available to our customers. As thousands of people every week capitalize on our savings and services, we hope you too, will make Lyco Computer your first choice. *What about warranty or service?* Our Customer Service Department is available at (717) 494-1670 to assist you. We back all of our manufacturer's stated warranty terms. Before returning any item that appears to be defective, we ask that you call our Customer Service Department. *Will you rush an item to me?* We offer next day air, two day air, standard UPS, and postal international shipping services. Temporary shortages are normally filled within 10 days. *How do I order?* We have always accepted C.O.D. orders through UPS. Prepaid cash orders over $50 are shipped freight-free in continental U.S. For orders under $50, please add $3 for freight. Personal and company checks require a 4 week clearing period. Visa, Master Card, American Express and Discover Card orders are accepted for your convenience. Purchase orders are accepted from Educational Institutions. We charge sales tax on deliveries in PA. For APO, FPO, and international orders, add $5 plus 3% for priority mail. Advertised prices and availability are subject to change. Send your order to Lyco Computer, P.O. Box 5088, Jersey Shore, PA, 17740. Or, call 1-800-233-8760 or (717) 494-1030. Return restrictions apply. Not responsible for typographical errors.

IBM Computers

New Lower Prices!

Occupation & Saftey & Health Administration Regulations for LABOR

PS/Value Point VESA Systems

486 SX/25 120MB DOS/WIND VESA	$1269.95
486 SX/25 245MB DOS/WIND VESA	$1489.95
486 SX/33 120MB DOS/WIND VESA	$1489.95
486 SX/33 340MB DOS/WIND VESA	$1869.95
486 DX/33 120MB DOS/WIND VESA	$1719.95
486 DX/33 340MB DOS/WIND VESA	$2099.95
486 DX2/66 245MB DOS/WIND VESA	$2359.95
486 DX2/66 340MB DOS/WIND VESA	$2539.95

*OS2 Versions Available - $CALL

*Space Saver and Tower Versions Available - $CALL

Lyco Computer 800-233-8760

P.O. Box 5088 Jersey Shore, PA 17740

Customer Service (717)-494-1670

DISCOVER NOVUS VISA (717)-494-1030 Fax: (717)-494-1441 MasterCard

Circle 126 on reader service card

COMPAQ, Toshiba, AST, NEC, Leading Edge.

Super direct buying above the brand name choices, a superstore with the price convenience of direct marketing. You receive custom configured "plug and play" systems, overnight delivery, lifetime technical support and flexible payment plans.

GUARANTEED LOWEST PRICE

Lowest Price

[illegible]

THIRTY DAY WORRY-FREE

Money Back Guarantee

[illegible]

TWO-DAY DELIVERY $19.95 GUARANTEED

2nd Day Delivery

[illegible]

TOLL-FREE SUPPORT LIFETIME

Lifetime Toll-Free Support

[illegible]

CUSTOM CONFIGURATION HAVE IT YOUR WAY

Custom Configuration

Eliminate installation hassles by letting PCs Compleat install software, extra memory, a modem, tape, or disk drive. Configuration is FREE!

Ask your sales consultant for a complete quote.

LEADING EDGE

WinPro 486 E

- 4MB expandable to 32MB
- 8KB cache expandable to 256KB
- Windows Accelerator
- MS-DOS, Windows 3.1, MS-Works MS-Productivity, Quicken

Processor	Drive	Price
486SX/25	120MB	$979*
486SX/33	170MB	$1099
486DX/33	170MB	$1239
486DX/33	260MB	$1349
486DX2/66	260MB	$1599

Color VGA monitors start at $229.99

Lease for $50/mo.

$979*

COMPAQ

ProLinea Desktops

- 4MB RAM expandable to 32MB
- 3.5" floppy drive
- Local Bus graphics
- MS-DOS 6.0, Windows 3.1, Mouse

Model	Hard drive	Price
486SX25	120MB	$1099*
486SX25	240MB	$1299
486DX33	120MB	$1489
486DX33	240MB	$1679
486DX2/50	240MB	$1899

Bundles also available

COMPAQ SVGA monitors $349.99

Lease for $50/mo.

$1099*

AST Authorized Systems Reseller

Bravo Desktops

- 4MB RAM expandable to 64MB
- 120MB hard drive
- MS-DOS, Windows 3.1, MS Mouse
- 14" SVGA color monitor .28mm

Processor	Model 213/W
4/25s	$1359*
4/33	$1629
4/50d	$2179
4/66d	$2249

Lease for $50/mo.

$1359*

AST Authorized Systems Reseller

PowerExec

- 4MB RAM, expandable to 20MB
- Trackball, 2 PCMCIA slots
- Windows 3.1

Screen	Model	Price
386SL25Mono	83/W	$2009*
386SL25Mono	123/W	$2049
386SL25Active Color	203/W	$3499
486SL25Mono	203/W	$2429
486SL25Active Color	203/W	$4029

Lease for $73.73/mo.

$2009*

COMPAQ

Contura 4/25

- 25 MHz 486SL
- 4MB RAM expandable to 20MB
- 209MB hard drive
- 9.5" mono display
- MS-DOS, Windows 3.1, trackball

$2199*

Active matrix color display configuration $3479

Lease for $80.70/mo.

$2199*

TOSHIBA

T4600

- 33MHz 486SL processor
- 4 MB, expandable to 20MB
- 2 PCMCIA slots
- 9.5" diagonal display

Display	Hard Drive	Price
Mono	120MB	$2879*
Mono	200MB	$3139
Active matrix color	120MB	$4099
Active matrix color	200MB	$4359
Active matrix color	340MB	$4799

Lease for $105.65/mo.

$2879*

PCs COMPLEAT

One Convenient Location

PCs COMPLEAT

Real Service

TOLL-FREE SALES

1-800-398-4727

COMPAQ HOTLINE

1-800-377-4727

[illegible]

Texas Instruments

Whether it's portable computing...

More power, more choices, more value...with TI's TravelMate notebooks!

March 30, 1993
TravelMate 4000 WinDX2/50

TEXAS INSTRUMENTS

TravelMate 4000 WinDX2/40

- 4 or 8MB RAM expandable to 20MB
- 120 or 200MB hard disk drive
- 640x480 VGA color display (9.4")
- 256 colors
- MS-BallPoint/QuickPort connection
- MS DOS 6.0, Windows 3.1

Processor	RAM	Hard Drive	Price
486SX/25	4MB	120MB	$2599*
486DX2/40	8MB	200MB	$3649

Lease for $95.38

$2599*

TEXAS INSTRUMENTS

TravelMate 4000 WinDX2/50

- 4 or 8MB RAM expandable to 20MB
- 120 or 200MB hard disk drive
- 640x480 VGA display (10")
- 64 gray scales
- MS-BallPoint/QuickPort connection
- MS-DOS 6.0, Windows 3.1

RAM	Hard drive	Price
4MB	120MB	$2659*
8MB	200MB	$2999

Lease for $97.59

$2659*

ACTIVE MATRIX COLOR!

TEXAS INSTRUMENTS

TravelMate 4000E

- 486DX2/50 processor
- 4MB RAM expandable to 20MB
- 200MB hard disk drive
- 8.4" active matrix color display
- 256 colors, local bus video
- MS-BallPoint/QuickPort connection
- MS DOS 6.0, Windows 3.1

Lease for $157.77

$4299

or affordable printing, we have what you need.

TEXAS INSTRUMENTS

microWriter

Affordable laser quality printing

- Laser-quality, high resolution (300dpi) printing
- 5 pages per minute
- HP LaserJet II emulation
- 512K memory, expandable to 4.5MB

$649.99

TEXAS INSTRUMENTS

microWriter PS23

Postscript printing for under $1000

- 5 pages per minute
- Adobe Postscript support
- HP LaserJet II emulation
- 23 scalable built-in fonts
- 2MB memory expandable to 4MB
- Automatic emulation switching

$899.99

microWriter PS65

- 65 scalable built-in fonts

$1149.99

$899.99

TEXAS INSTRUMENTS

microLaser Turbo

High performance

- 9 pages per minute
- Adobe PostScript Level 2
- HP LaserJet II emulation
- Automatic emulation switching
- 35 built-in Adobe scalable fonts
- Weitek 8220 RISC-based 16MHz coprocessor
- 2.5MB memoty expandable to 6MB

$1429.99

Texas Instruments' microWriter and microLaser printers have been expertly designed to keep costs down while offering the highest level of performance. Each model features laser-quality, high resolution printing, reliable LED technology, a small footprint for true desktop use, an outstanding warranty, and upgradability so it grows with you. Choose the model that best suits your needs.

TEXAS INSTRUMENTS

TOLL-FREE SALES
1-800-398-4727

PCW-9/93

All prices subject to change and do not include shipping. Monitors are sold separately. Lease prices reflect 36 month operating lease. All products or brand names are trademarks of their respective companies. Not responsible for typographical errors. Texas Instruments, 34 Forest Street, Marlborough, MA 01752

Circle 232 on reader service card

Insight

THREE REASONS TO BUY FROM INSIGHT

1 BETTER

▼24-hour toll-free technical support, customer service and ordering, seven days a week, 365 days a year. ▼30-Day "Worry-Free" Money-Back Guarantee. ▼One-Year System Warranty. ▼Custom configuration of your system to suit your needs. ▼ *Computer Shopper* Best Buy Award for Hard Drives 5 straight years. ▼The best selection of some of the hottest brand names in computers, hardware and software.

2 FASTER

▼ Fully automated Federal Express delivery. ▼24-hour delivery on our most popular systems. ▼ 98% of in-stock items delivered the next business day. ▼Incredibly fast Insight computers.

3 CHEAPER

▼Our tremendous buying power means savings to you. ▼Wide range of payment options including low-cost leasing. ▼Use your Insight Credit Card - no down payments. No annual fee. ▼Call for your copy of our 52-page Insight catalog-FREE!

We accept all major credit cards. Ask about the low-interest Insight credit card and our easy-pay leasing programs.

Better, Faster, Cheaper!

800-998-8062

Insight **Buy the Super Direct™ way!**

Insight Multimedia
VL 486DX-33MHz
$2,299
I43VLM425F

Fully Upgradable Intel 80486 CPU
4MB RAM - 128K Cache
250MB 12ms IDE Hard Drive w/cache
32 Bit VL-Bus™ Compatible 1MB Graphics Accelerator SVGA Card
32 Bit VL-Bus IDE Controller
15" Non-Interlaced Super VGA Color Monitor
1.2MB 5.25" Floppy Drive
1.44MB 3.5" Floppy Drive
2 Serial & 1 Parallel Port
Enhanced 101 Key Keyboard
MS-DOS® 6.0, Mouse, MS Windows™ 3.1
Desktop Case, Full Vertical Available
Talon TA-100 CD-ROM Drive
Sound Blaster™ Compatible Sound Board
Amplified Stereo Speaker Set
5 CD-ROM Titles

Insight VL-BUS™
486DX2-66MHz
$2,199
I43VLM425F

Awesome Local Bus Speed
Fully Upgradable Intel 80486 CPU
4MB RAM - 128K Cache
32 Bit VL-Bus™ IDE Compat. 1MB Graphics Accl. SVGA Card
32 Bit VL-Bus IDE Compat. Controller
15" Non-Interlaced Super VGA Color Monitor
1.2MB 5.25" Floppy Drive
1.44MB 3.5" Floppy Drive
2 Serial & 1 Parallel Port
Enhanced 101 Key Keyboard
MS-DOS 6.0 - Mouse - MS Windows 3.1
Desktop Case - Full Vertical Available

intel inside

486DX-33MHz.....$1,899
486DX2-50MHz....$1,999

Insight **Insight EcoSystem™**

The Insight EcoSystem™
Cut your energy costs with high quality Insight computers.

Insight introduces the EcoSystem™ family of power-efficient PC's that meet the EPA's Energy Star requirements. At idle, the Eco-System™ computers use less than 60 watts of power including the monitor, compared to 200 watts or more used by conventional PC's. Reduce your computing power expense by two-thirds and make a significant contribution to the environment and your bottom line.

Upgradable Intel '486 Microprocessor
4MB RAM, expandable to 32MB
340MB 12ms Western Digital IDE HDD
1.44MB Floppy Drive
128K Cache
1MB SVGA Video on the CPU Local Bus
15" non-interlaced SVGA Color Monitor **with power down mode**
2 serial, 1 parallel & 1 mouse port
Enhanced 101 key keyboard
Mouse - MS-DOS 6.0 - Windows 3.1
Low-profile Case

energy

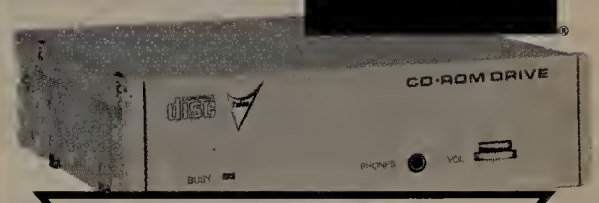
486SX-33MHz I4S3GPC434.....$1,999
486DX-33MHz I43GPC434.....$2,199
486DX2-66MHz I46GPC434.....$2,399

EVERYTHING YOU NEED 24 HOURS A DAY

Insight

HARD DRIVES
International

Western Digital HDD
340MB 3.5"IDE
$329
12ms HH
WD234ØA



Talon CD-ROM
TA-100 Internal
$199 FREE CD's
ODTA1ØØBK

The Talon Internal CD-ROM drive gets you up and running with 375ms access time, 32K buffer, 150KB transfer rate and adapter. FREE CD software: A Line in the Sand and National Parks Guide CD's.

COMPLETE HARD DRIVE KITS

Bare Drive Kits Include:
▼ Complete mounting kit (3.5" kits include 5.25" bezel). ▼ All mounting hardware (includes screws). ▼ HDI's Hard Drive Reference Manual.
▼ Step-by-step installation instructions.

For 16 Bit (286/386/486) Kits Add:
▼ 1" to 1" interleave hard/floppy Controller or appropriate interface.
▼ Cable.

8 (PC/XT) and 32 (EISA) Bit Kits also available

40MB to 1.9 GIG!

Size	Access	Form Factor	Manufacturer	Interface	Model#	Bare	16 Bit Kit
210MB	12ms	3.5" 1"H	WESTERN DIGITAL	IDE	WD22ØØA	$199	219
340MB	12ms	3.5" 1"H	WESTERN DIGITAL	IDE	WD234ØA	329	349
452MB	12ms	3.5" 1"H	Seagate	IDE	ST355ØA	529	549
540MB	12ms	3.5" 1"H	Seagate	IDE	ST3655A	649	669
520MB	12ms	3.5" HH	FUJITSU	SCSI	FJ2624S	699	849
1000MB	15ms	5.25" FH	Seagate	SCSI	ST412ØØN $1/MB	999	1,149
2900MB	11ms	5.25" FH	Seagate	SCSI	ST434ØØN $1/MB	2,999	3,149

CD-ROM

Talon TA 100 Basic $199
Talon TA 100 Deluxe 269
Talon TA 200 Basic 439
Talon TA 200 Deluxe 499
Texel Internal 389
Mitsumi 229
Teac 379

NETWORKING

Artisoft

AE-2 Ethernet Card $189
AE-2 Starter Kit 5.0 199
NodeRunner 2000/c 479

Intel

EtherExpress 16 BNC or 10 Bit Kit $139

Novell Netware V 3.11

5 User $729
20 User 2,099

Microsoft

Win for Workgroups $159
Win for Workgroups Starter Kit 589

SMC

SMC Ether card 6 pack $699
SMC Elite Concentrator 3608TP 349

3 COM

3C579 EISA 10BT $259

MEMORY

SIMM

Great for 286/386/486
1MB x9 80ns ..... call
1MB x9 70ns ..... call
256KB x9 70ns ..... call
4MB x9 70ns ..... call
512 x36 2MB 32bit ..... call
1 x36 4MB 32bit ..... call
2 x36 8MB 32bit ..... call

TAPE BACKUP

Colorado

Colorado 120MB $159
Colorado 250MB 219
Trakker 120MB 339
Trakker 250MB 399

Talon

120MB Internal $149
250MB Internal 219
250MB Parallel Port 349

WangDAT

2GB Internal 16 Bit Kit $999
4GB 3200 Internal 16 Bit Kit 1,299
4GB External 16 Bit Kit 1,399

REMOVABLE STORAGE

Iomega

Bernoulli Pro Internal Kit $499
PC Powered 150 799
Insider Multidisk™150 Disk 769
PC Powered 90 Pro 599
Mac Transportable 150 799
PC2B Interface Card 159

SYDOS

441-44MB drive, 8 Bit adapter, 1 cart $419
Puma 88-Parallel external 88MB drive 489
881L-88MB drive, 8 Bit adapter, 1 cart 519
88EL-88MB ext. drive, 8 Bit adapter, 1 cart 579

MULTIMEDIA

Creative Labs

Discovery CD 8 Internal Kit $449
Discovery CD 16 Internal Kit 525
Edutainment CD 8 Internal Kit 529
Edutainment CD 16 Internal Kit 589
Sound Blaster 16 229
Sound Blaster™ MIDI Kit 59
Video Blaster 349
Video Spigot for Windows 469

Media Vision

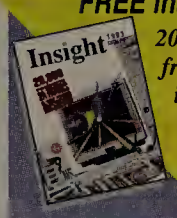
Pro Audio Spectrum 16 ..... $189
CDPC XL 1,149
Fusion 16 CD System 529
Pro 16 Multimedia System 949

Talon

TA-1010 Multimedia Kit $299
TA-2000 Multimedia Kit 699

"The options available from this direct marketer are virtually unlimited." -PC Magazine

FREE Insight Catalog. Call now!



20,000 products to choose from, the Insight catalog is your Super Direct™ source for computers, hardware and software.

Insight
1912 West Fourth Street
Tempe, Arizona 85281
602-902-1176 Fax - 602-902-1180
National Accounts - 800-998-8063
Corporate Fax - 602-902-1191
Government Fax - 602-902-1126
Educational Fax - 602-902-1177

Prices and availability subject to changes without notice. All items are NEW. PO's accepted from qualified buyers-NET 30. APO/FPO orders add $16 for US Post express mail. PO's, 30-Day Guarantee and 1-Year Warranty may have some restrictions. Shipping is non-refundable. All trademarks are the properties of their respective owners. Opened software is not returnable. Intel Inside is a registered trademark and OverDrive™ and OverDrive™ Ready are trademarks of Intel Corporation. 9/93
©Insight Distribution Network, Inc. 1993.

MONITORS

Insight

15" N.I., .28 SVGA $399
17" N.I., .28 SVGA 899

NEC

MultiSync 3FGe 15" $639
MultiSync 4FGe 15" 749
MultiSync 5FGe 17" 1,299
MultiSync 6FG 21" 2,359

Hitachi NSA

SuperScan™ 15" $479
SuperScan™ 17" 949
SuperScan™ 20" 1,359
SuperScan™ Pro 20" 1,699
SuperScan™ ProXL 21" 2,349

SOFTWARE

Act for Windows $225
Corel Draw! 3.0 365
Generic Cadd 6.0 255
Lotus Smart Suite 419
Microsoft AccessWindows 395
Microsoft Excel 4.0 289
Microsoft Word 2.0 295
Norton Utilites 99
Quicken Windows 2.0 39
Word Perfect 5.1 DOS 269
Word Perfect 6.0 DOS 279
Word Perfect Windows 269

PRINTERS

IBM Printers by Lexmark

Model 2380 ..... $329
Model 2381 459
Model 2390 329
Model 2391 459
Model 4019E01 Printer E 749
Model 4019001 Printer 1,189
Model 4029020 Laser 6 1,189
Model 4029022 Laser 6P 1,359
Model 4029030 Laser 10 1,259

Canon

BJ-10ex $289
BJ-200 339
BJ-230 449
BJC-800 (Parallel) 1,849
BJC-820 (SCSI) 1,999
Laser LBP 4SX 699
Laser LBP 8SX 1,299

Fujitsu

DL1200 ..... $289
DL5000 339
Print Partner 10 1,479
Print Partner 10W 1,899

TI Printers

TI Microlaser $869
TI Microlaser PS17 1,099
TI Microlaser PS35 1,299
TI Microlaser PS35 Turbo 1,549
TI MicroWriter 669
TI MicroWriter PS235 919
TI MicroWriter PS65 1,199

Better, Faster, Cheaper!

800-998-8062

Insight **Buy the Super Direct™ way!**

Circle 121 on reader service card

FIVE YEARS IN THE MAKING

THE MIS PROMIS

"Five years!? How do you guys do it? How do you manage to be successful with all the big boys dropping their prices?" At MIS, not a day passes without being asked those questions. The answer is simple. MIS builds a better computer. We have steadfastly believed that our customers realized how much a computer actually costs when, after a six week wait, it shows up in your office with a defect or, a malfunction occurs in 1 out of 3 systems within the first year of use. We know that you want a well built and reliable computer that satisfies your company's requirements and you want it now.

"if you're looking for an all-around solid performer at a good price, the M466 should make your short list"

- PC World

"what emerges is the kind of quiet, unassuming machine that will sit in your office, do everything you need done, never give you a day's trouble and become an old friend about five minutes after you open the box. And it will run faster than is allowed in some states."

- InfoWorld Direct

If fixing computers and holding on tech support lines is your life and you want to change it, give MIS a call.

PROMIS ST

Celebrating five years of quality products

PROMIS MT
486SX/25 through 486DX2/66 Local Bus or EISA, Pentium socket in a Mid-Tower case.
Starting at $1,795

PROMIS MAT
486SX/25 through 486DX2/66 Local Bus or ISA, in a mini AT case and easy upgrades. ZIF!
Starting at $1,495

PROMIS SL
486SX/25 through 486DX2/66 Local Bus or ISA. Slimline case for the work station.
Starting at $1,495

PROMIS AT
486SX/25 through 486DX2/66 Local Bus or EISA, Pentium upgrade and a full size AT case.
Starting at $2,195

MADE IN THE U.S.A.

To order or for more informations, please call toll free

1-800-733-9188

Prices and terms are subject to change without notice. 30 days money back does not include shipping charge. CA residents add appropriate sales tax. No surcharge on credit card purchases. Personal and company checks require 2 wks clearance. The Intel Inside Logo is a trademark of Intel Corporation. All other names and logos used here are registered trademarks of their respective companies.

Circle 172 on reader service card

PC WORLD CATALOG

Shop The PC World Catalog For Fast Solutions To Your PC Needs

The *PC World* Catalog is the most cost efficient way to bring your product message to managers proficient with PCs, the group identified by study after study as today's key buyers of computers and related equipment.

Your message can reach buyers in a variety of ways. The "Business Class" section brings your ad to our 901,000 readers with four-color impact. *PC World's* "Computer Showplace" section highlights your ad in black and white, with a choice of display or text/only formats (standard red can be added as a second color).

For complete information on Catalog advertising, please call toll-free 800-262-9885 or 203/838-1425 Fax. PC World Catalog, c/o RAM, 50 Washington Street, South Norwalk, CT 06854.

Advertising Sales Staff

Pat Fales
Catalog Manager
203-857-5120

Dean Lucente
Western Account Manager
203-857-5102

Sally Naylor
Catalog Coordinator
203-857-5100

Chris Kimball
Eastern Account Manager
203-857-5101

Product Category	Business Class	Computer Showplace
HARDWARE		
Communications	302	306
Computer Systems	302	306
Memory Cards	303	
Peripherals	304	306
Security	304	
SOFTWARE		
Business Applications	305	308
CD Rom	305	
Church Applications		308
Data Entry		308-309
Educational		309
Financial		309
Flow Charting		309
Foreign Language		309
Mailing Programs		309
Mail Order		309
Maintenance Management		309
Manufacturing		309
Medical		309

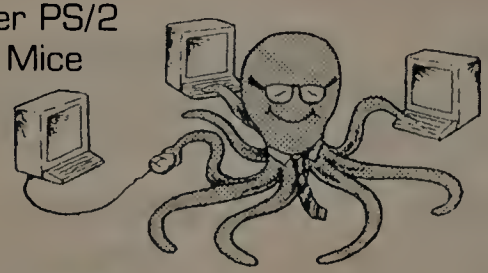
Product Category	Business Class	Computer Showplace
Music		309
On-Line Service		310
Public Domain/Shareware		310
Real Estate		310
Restaurant Point of Sales		310
School Applications		310
Statistics		310
Surveys		310
Utilities		310
MISCELLANEOUS		
Accessories	304	306
Bar Coding		306-307
Battery		310
Computer Insurance		307
Data/Disk Conversion		307
Disk Copy Service		308
Disks		307
On-line Services	305	
Supplies		308
Toner Recharge		308

HARDWARE/Communications - Computer Systems

PC-EXPANDER PLUS™

Connect up to 8 VGA Monitors, Mice and Keyboards to a Single PC

- PC/AT, PS/2 and 100% Compatibles
- VGA up to 1024 x 768 Resolution
- Selectable Takeover Delay
- Use either PS/2 or Serial Mice



CYBEX

4912 Research Drive • Huntsville, AL 35805 U.S.A.
(205) 430-4000 • FAX (205) 430-4030

Dealer Program Available **Made in USA**

CIRCLE 516 ON READER SERVICE CARD

COMMANDER

CONTROL UP TO 96 PC FILE SERVERS WITH 1 KEYBOARD, MONITOR, AND MOUSE

- Select via Keyboard
- Dual access to 150 feet away (optional)
- "AutoBoot™" Feature boots attached computers without operator intervention
- Use either PS/2 or Microsoft serial mouse with available cables
- Each unit accommodates from 2 to 8 PCs; cascade up to 12 units

CYBEX

4912 Research Drive • Huntsville, AL 35805 U.S.A.
(205) 430-4000 • FAX (205) 430-4030

Dealer Program Available **Made in USA**

CIRCLE 517 ON READER SERVICE CARD

We Project Your Promotion

For the latest in color projection panels and projectors call the experts in LCD technology. Your satisfaction guaranteed or your money back.

FREE CATALOG 1 800 726 3599

SALES • LEASES • RENTALS

Panelight DISPLAY SYSTEMS, INC.

101 The Embarcadero Ste. 100-A, San Francisco, CA 94105
Hours: 6:30 to 5:30 PST, 9:30 to 8:30 EST. VOICE: 415 772 5800
FAX: 415 986 3817. *With purchase of our best selling Active Matrix Panell

CIRCLE 406 ON READER SERVICE CARD

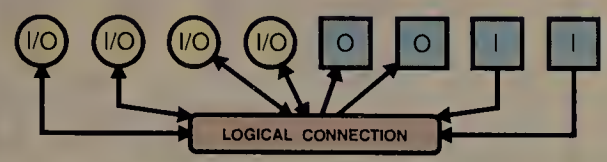
You CAN Afford Four-Color Impact

In fact, you can't afford not to advertise in color. Industry studies and years of ad tracking show that color ads typically outsell black and white ads by over 40%. PC World's Business Class section brings your four-color ad to over 901,000 of North America's most influential PC buyers at very economical rates.

Call now for more information 800/262-9885

PRINTER SHARING & MEMORY

I/O = input /output
◯ = serial
▢ = parallel



800-238-9415

LCX-1000 (1Mb) **$495**
8 ports; 4 serial I/O; 57,600 bps
2 parallel in, 2 parallel out

LC-256 (256Kb) **$375**

LC-512 (512Kb) **$425**
8 ports; 4 serial I/O; 19,200 bps
2 parallel in, 2 parallel out

LXFR-ETC **$49**
Windows & OS/2 File Transfer
4 user license, for LC or LCX

PB-42PP-256Kb **$199**

PB-42PP-1Mb **$249**
6 parallel ports; 4 in / 2 out
Upgradable to 4Mb; 25,000 cps

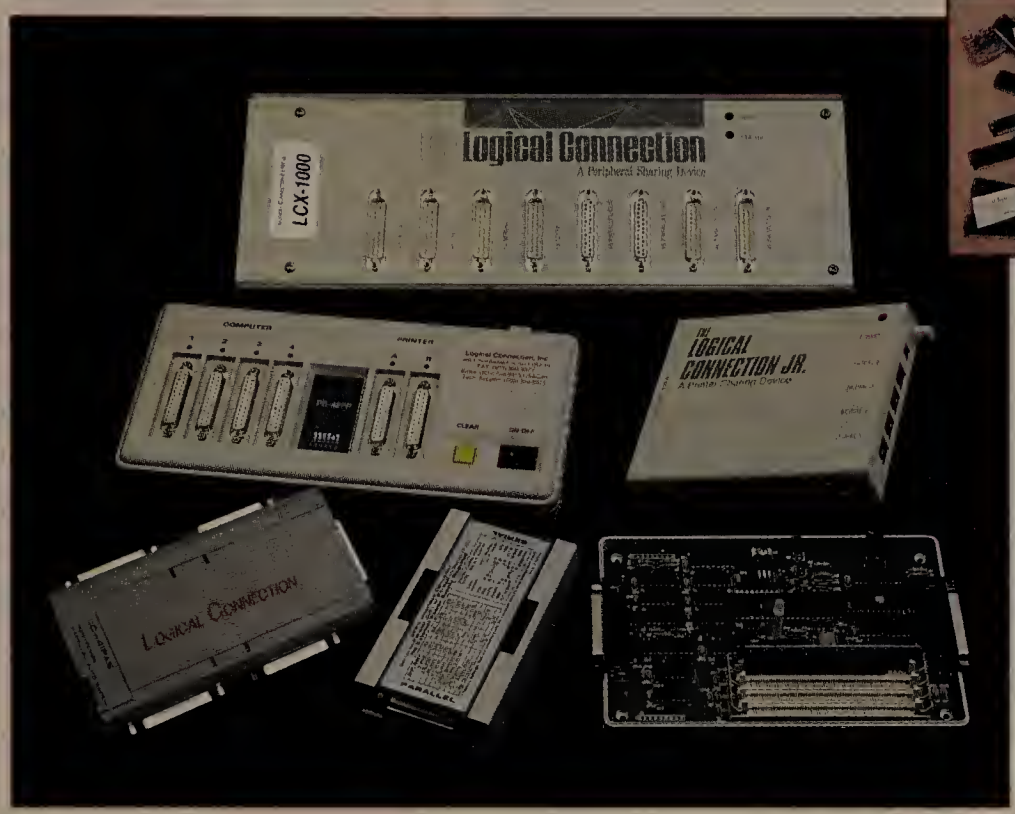
LC-41PAS **$69**
5 parallel ports; 4 in / 1 out
Smart-switch; 25,000 cps

LC Jr.-256 (256Kb) **$199**

LC Jr.-512 (512Kb) **$249**
5 ports; 4 serial in, 1 parallel out
Up to 115,200 bps

SPPS **$49**
9600 bps to 115,200 bps
Serial / Parallel Converter

PB-11PP-1Mb **$199**
2 parallel ports; 1 in / 1 out
Upgradable to 16Mb; 75,000 cps



PCMCIA 2.0 *SRAM Cards:*
512Kb - $120, 1Mb - $175, 2Mb - $295

Toshiba:
1000XE/SE/LE, 1800, 1850, 2000,2000SX/SXE, 2200SX
2Mb - $90, 4Mb - $150, 8Mb - $275
3300SL
4Mb - $150, 6Mb - $225
4400SX
4Mb - $150, 8Mb - $275

Powerbook & MAC:
100/140/145/170/160/165/180
6Mb - $250, 8Mb - $310, 10Mb - $390
DUO 210/230:
6Mb - $260, 8Mb - $320, 10Mb - $410
Cent.610/650, Quad.800, LCIII
4MB - $145, 8Mb - $260

MAC SIMMs (70ns.):
1x8 - $32, 4x8 - $124, 16Mb - $495

LOGICAL CONNECTION® 4660 Portland Road NE #108 Salem, OR 97305-1658 Tech.: (503) 390-9375 **FAX: (503) 390-9372**

CIRCLE 420 ON READER SERVICE CARD

BUY LOW. SELL HIGH.

PC WORLD'S Business Class section offers four-color selling power at super low prices. What, you didn't know color ads outsell black and white by over 40%? But get this: your quarter page ad (on a typical, twelve time rate) will run for only $4560 per issue! Can you afford NOT to advertise in Business Class?

Call the PC WORLD Classified Department NOW for details. 800/262-9885

Advertising Age Reports:

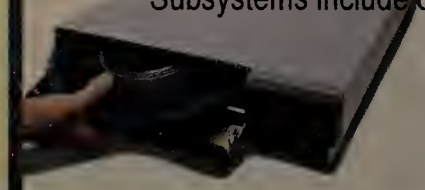
PC WORLD's *ad sales jumped 23.3% during last year's "recession". Why? Because products sell when advertised in these pages. Every issue, every day, in good years and bad,* PC WORLD *works.*

Contact Catalog sales today: 800/262-9885

9-Track for PCs

Mainframe to PC data interchange

Rock solid solutions, rock bottom prices.
Direct from the manufacturer. 1600 & 6250 bpi.
Subsystems include drives and software.



800-729-8725

OVERLAND DATA®
Since 1980

Tel: 619-571-5555 • FAX: 619-571-0982
Europe: Tel: (+49) 6172-35027 • FAX: (+49) 6172-35028

3480 Now With IDRC!

Ask about 3480 tape drives too

CIRCLE 430 ON READER SERVICE CARD

URGENT!

STOP COMPUTER THEFT

Would you leave $2500 in cash on your desk and go to lunch?

Then why leave your computer?

Secure your equipment with the . . .

Kablit™ Security System

Kablit products are known for their quality and reliability. Our customers can testify to the security effectiveness of our products and they still have their computers to prove it.

- Master Lock™ included with each security system.
- Lifetime warranty on all parts.

Security packages for all types of office equipment:

- COMPUTERS
- PRINTERS
- LASER PRINTERS
- MONITORS
- SCANNERS
- HARD DRIVES
- FAX MACHINES
- OTHERS

Call for your free catalog:

Secure-It
18 Maple Court
East Longmeadow, MA 01028

413-525-7039
800-451-7592

CIRCLE 433 ON READER SERVICE CARD

HIGH-PERFORMANCE PARALLEL-TO-SCSI CONNECTIONS!

"This product...is darned near perfect." –Jerry Pournelle, Byte Magazine 3/93
"...even more elegant than its predecessor and almost twice as fast." –Jim Seymour, PC Magazine 12/92

Connect up to 7 SCSI devices to your parallel port and still use your printer! Buy the **MiniSCSI™ Plus** adapter to run CD-ROMs, tape, SyQuest®, Bernoulli® or other SCSI devices.

FEATURES:
- 100% Printer Passthrough
- Just 7.2 Oz.
- Only $219.00
- EPP Version Available
- See Your Dealer or Call: 1-800-TRANTOR

5415 Randall Place • Fremont, CA 94538
Fax: (510) 770-9910
Adaptec Interactive Fax: (408) 957-7150

Trantor
An Adaptec Company

© 1993 Trantor Systems Limited. MiniSCSI and Trantor are trademarks of Trantor Systems Limited. All other trademarks used are owned by their respective owners.

CIRCLE 469 ON READER SERVICE CARD

Polaroid has the Answer to the Glaring Problem

Turn Your Monitor into a High Quality Display with Polaroid Circular Polarizer Filters!

The problem of computer glare has been well documented. Bright light from windows or overhead lamps reflects off computer displays causing operators to strain in order to read data. This results in sore eyes, blurred vision, headaches, fatigue and loss of productivity.

Polaroid Circular Polarizer Filters suppress up to 99% of reflected light and are more effective than any other kind of filter for improving contrast, so you see clearly with less effort. Also, most CP-Filter models have a transparent electrically conductive coating which reduces up to 98% of electric field radiation, and allows for static control grounding of the filter. All models now utilize convenient and attractive universal mounting systems for easy compatibility, quick attachment, and a great fit.

Polaroid offers a full range of Circular Polarizer Filters which allows you to select the one that best meets your needs. The CP-90 for 10" to 15" monitors and the CP-Workstation for 16" to 21" monitors – durable top quality glass filters with conductive coating. The CP-60SC and CP-60 for 9" to 15" monitors – low cost, high quality alternatives to our glass filters, with and without conductive coating.

Polaroid

Polarizer Division 1 Upland Road/N2, Norwood, MA 02062 1-800-225-2770

CIRCLE 426 ON READER SERVICE CARD

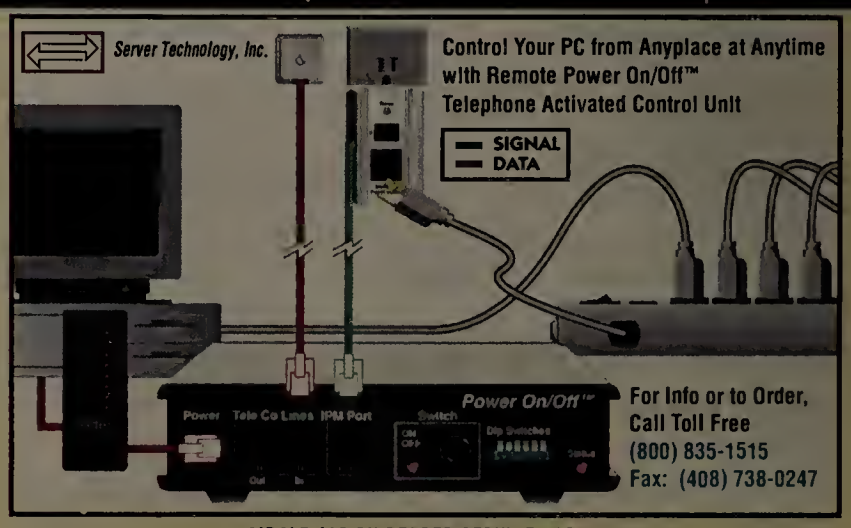
BUY LOW. SELL HIGH.

PC WORLD'S Business Class section offers four-color selling power at super low prices. What, you didn't know color ads outsell black and white by over 40%?
But get this: your quarter page ad (on a typical, twelve time rate) will run for only $4560 per issue! Can you afford NOT to advertise in Business Class?

Call the PC WORLD Classified Department NOW for details.

800/262-9885

Remote Power On/Off™ $169.95



CIRCLE 410 ON READER SERVICE CARD

Explore the Internet - FREE!

DELPHI, a leading international online service, now offers full access to the Internet. You can explore this incredible electronic network with no risk. You get 5 hours of evening/weekend access to try it out for free!

Use electronic mail to exchange messages with over 10 million people throughout the world. Download programs and files using "**FTP,**" connect in real-time to other networks using "**Telnet,**" and participate in "**Usenet Newsgroups**" the world's largest bulletin board with over 3500 topics. If you're not familiar with these terms, don't worry; DELPHI has expert online assistants and a large collection of help files, books, and other resources to help you get started.

After the free trial you can choose from two low-cost membership plans. With rates as low as $1 per hour, no other online service offers so much for so little.

5-Hour Free Trial!

Dial by modem, 1-800-365-4636*
Press Return once or twice
At Username, enter **JOINDELPHI**
At Password, enter **PCW39**

DELPHI

Questions? Call 1-800-695-4005 (voice)
Send e-mail to INFO@delphi.com

*Current Internet users can Telnet to delphi.com instead. Complete details provided during the toll-free registration

Starting Your Business™

SUCCESSFULLY START ANY business with this integrated software for the IBM-PC. Ease through steps, worksheets, business licenses, incorporating, federal regulations, taxes, financing and more! To order, or for free information on *Starting Your Business* for $79 - a $29 savings, **call 1-800-783-7053.**

THE COMPLETE BUSINESS STARTUP SOFTWARE FOR TODAY'S ENTREPRENEUR

DOS & WINDOWS NOW FOR

DMACS SOFTWARE

Risk-free 60 day money back guarantee

CIRCLE 408 ON READER SERVICE CARD

Increase Productivity with Internet Archives

This disc contains a copy of CICA, the internet's largest Windows archive. Hundreds of megabytes of MS Windows programs on your desktop save you time and money. Our friendly shell makes accessing all these files easy. Includes hundreds of utilities, screen savers, backup/restore programs, diagnostics, data conversion programs, games, demos for many commercial Windows programs, fonts, icons and bitmaps. There are programming tools for C, C++, Toolbook, Turbo Pascal, and Visual Basic. This disc is configured for Opus, RBBS, Pcboard, Wildcat, and Spitfire BBS's. Made in April 1993.

CICA MS Windows CDROM $24.95*

Simtel MSDOS CDROM $24.95*

Packed full of the world's highest quality MSDOS shareware from the internet — every DOS user should own this disk! With 8,818 files, Simtel contains something for everyone. Includes our friendly shell program to help you find whatever you need, whether it be utilities, communications programs, BBS's, editors, documentation, databases, BBS index files. Made in May 1993.

Giga Games CDROM $39.95*

An amazing collection of games, from classic arcade to the latest windows simulations to educational games for all ages. BBS ready. Made in July 1993.

**Shareware programs require separate payment to authors if found useful.*

CALL, SEND EMAIL OR FAX TODAY! **1-800-786-9907**
Info@cdrom.com
FAX +1-510-674-0821

$5 S&H per order (USA, Canada, Mexico)
$10 overseas +1-510-674-0783 AMEX/VISA/MC/COD

Full money-back guarantee

Walnut Creek CDROM
4041 Pike Lane, Suite D-539
Concord, CA 94520

CIRCLE 416 ON READER SERVICE CARD

How to Make Your Product Leap Off the Shelf

It's no secret anymore. *PC World's* "Computer Showplace" has become one of America's most successful selling platforms for hardware and software. Reader responses for the last twelve months have averaged 398 replies per ad, an increase of 43% over the prior year. And the price is remarkably affordable. A 2" ad in "Computer Showplace" costs about $1100 at the 12 time rate. So figure it out—if your ad just pulls the typical response of 398 inquiries, can you afford NOT to advertise in *PC World?*

Hardware

COMMUNICATIONS/MODEMS

FAX-ON-DEMAND + VOICE PROCESSING

dVOICE's™ features include:

- One call fax mode
- Fax back mode
- Voice mail
- Text to speech
- High level programming language
- Inbound and outbound capabilities
- Automated receptionist
- Built-in database capabilities

MULTIVERSE • 212-580-0541

COMPUTER SYSTEMS

USED COMPUTERS

IBM, COMPAQ & MAJOR BRANDS
Also IBM PCjr & Convertible
Accessories, & Service.
Computers from $99
Monitors from $49
New CGA Color Monitors $129
IBM 5140 Laptops $349
Software, Keyboards, Parts
Hard to find parts
FREE CATALOG
Call (214) 276-8072
P.O. Box 461782
Garland, TX 75046-1782
FAX & BBS (214) 272-7920

Advertising Age Reports:

PC WORLD's *ad sales jumped 23.3% during last year's "recession".*

Why? Because products sell when advertising in these pages. Every issue, every day, in good years and bad, PC WORLD *works*

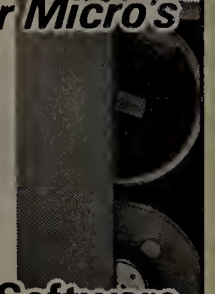
Contact Catalog sales today: 800/262-9885

PERIPHERALS

9-Track 3480

Fastest, Most Reliable Drives for Micro's

6250
3200
1600
800



Intuitive Software, Super Support, & SCSI Too!

MAINFRAME 9-TRACK for MICRO's

800/842-0708
HAUPPAUGE, NY • 516/273-5900

TDX PERIPHERALS

The Only Professional Choice

CIRCLE 513 ON READER SERVICE CARD

Save BIG $$$ on printing costs!!!

MacInker™

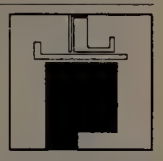
Better than new cartridges for less than 5¢

Over 200,000 sold. Beautiful printing and longer printhead life. Call for complete information.

Epson MacInker	48.00
Universal Cartridge Model	79.45
MultiColor Adapter	40.00

Jet-Master™

Re-usable jet-printer recharge kit. Just buy ink later as needed.



- Simple, trouble-free operation.
- Average recharge cost is $1-$2.
- Most jet-printers supported, single and multicolor.
- Brilliant, bold color inks available for HP cartridges.

HP Deskjet	24.95
HP 4-color	49.95
HP QuietJet	26.95

ComputerFriends, Inc.
14250 NW Science Park Drive
Portland, OR 97229
To Order 1-800-547-3303
Tel. (503) 626-2291

CIRCLE 483 ON READER SERVICE CARD

PC WORLD DELIVERS THE BUYERS YOU NEED TO REACH!

Study after study has proven that managers proficient with PCs now control the business PC buying process. Make sure your advertising gets maximum exposure in your best target market.

Miscellaneous

ACCESSORIES

FREE GLOBAL CATALOG

204 page guide to computer furniture, supplies and accessories
Dial Toll-Free
1-800-8-GLOBAL

GLOBAL COMPUTER SUPPLIES
11 Harbor Park Dr., Dept 91 PCW
Port Washington, NY 11050

CIRCLE 508 ON READER SERVICE CARD

BATTERY

LONG-LIFE BATTERY PACKS

Why take a Two-Hour Notebook on a One or Two-Day Job? Power To Go's (external, plug-in) battery packs provide from four to seven times longer operating time for your notebook computer! — and, PTG batteries have no "memory", and have a stable shelf life. Powers printers and phones, too!

POWER TO GO™
2889 E. Overlook Rd.
Cleveland, OH 44118-2445
(800) 332-POWER
FAX: (216) 371-5557

BAR CODING

TPS Electronics

800-526-5920
Call Toll-Free U.S. & Canada
FAX: 415-856-3843

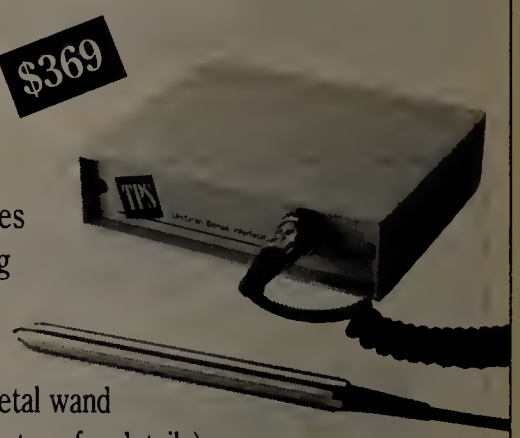
All TPS products carry 30-Day Money-Back Guarantee

MasterCard VISA AMERICAN EXPRESS

4047 Transport Street, Palo Alto, CA 94303 Phone: 415-856-6833

Bar Code Reader for IBM and MACINTOSH

$369



- Reads all popular bar codes
- Rugged aluminum housing
- No software/hardware modifications
- Includes removable all metal wand
- Lifetime warranty (see factory for details)
- Works with any program or operating system
- Withstands 6ft. drop to concrete
- Also available: Barcode printing software, portable readers, magnetic stripe readers and encoders

CIRCLE 434 ON READER SERVICE CARD

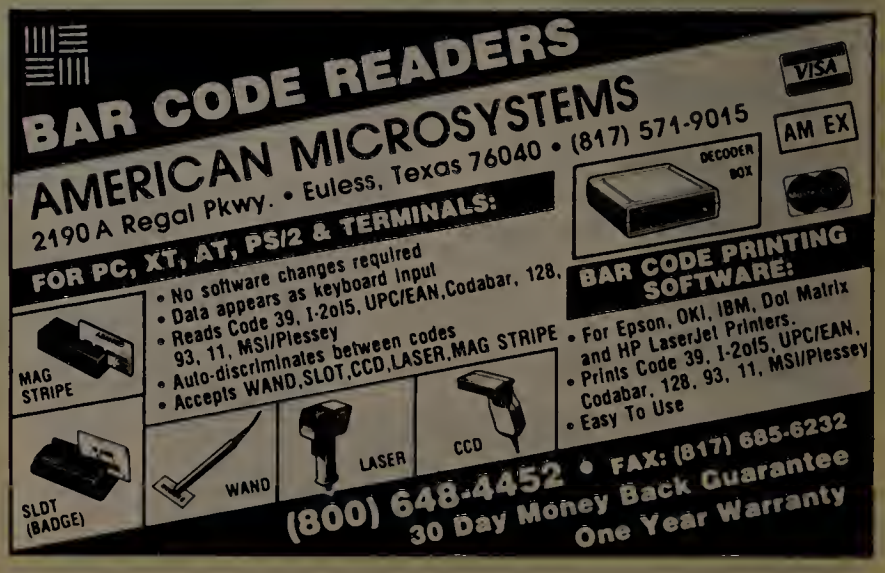
BAR CODE READERS

AMERICAN MICROSYSTEMS
2190 A Regal Pkwy. • Euless, Texas 76040 • (817) 571-9015

VISA AM EX

FOR PC, XT, AT, PS/2 & TERMINALS:

- No software changes required
- Data appears as keyboard input
- Reads Code 39, I-2of5, UPC/EAN, Codabar, 128, 93, 11, MSI/Plessey
- Auto-discriminates between codes
- Accepts WAND, SLOT, CCD, LASER, MAG STRIPE



BAR CODE PRINTING SOFTWARE:

- For Epson, OKI, IBM, Dot Matrix and HP LaserJet Printers.
- Prints Code 39, I-2of5, UPC/EAN, Codabar, 128, 93, 11, MSI/Plessey
- Easy To Use

(800) 648-4452 • FAX: (817) 685-6232
30 Day Money Back Guarantee
One Year Warranty

WORTHINGTON DATA SOLUTIONS

BAR CODE HEADQUARTERS

OFFICES IN USA AND EUROPE

Labeling Software

For PC with Dot Matrix or LaserJet

- Any Format, Any Size
- Formats for Sears, TCIF, K-Mart, Penny's, AIAG, WalMart, Logmars, etc.
- WYSIWYG Design
- Bar Codes: UCC-128, UPC/EAN, 2of5, MSI, 11, UPC/EAN, 2of5, 128, Code 39, etc.
- Big Text and PCX Graphics too!
- Powerful, Versatile, Easy to Use
- Imports ASCII data files from dBase, etc.
- Above Label Printed by LabelRIGHT™–**$279**

Thermal Transfer Printer with Labeling Software

- Fargo's Allegro Printer
- Up to 4"label width
- Small size, only 20 lbs.
- Prints UPC/EAN, 2of5, 128, 39
- Scalable text & PCX graphics
- Packaged with LabelRIGHT thermal™ software, serial cable, ribbon & labels
- Complete package, ready to use – **$ 1895**

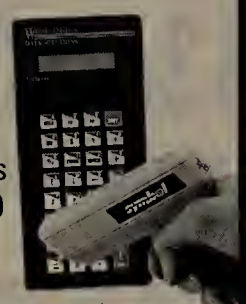
Bar Code Readers

for PC, XT, AT, PS/2, Macintosh and RS-232 Terminals

- Attaches as 2nd Keyboard
- UPC/EAN, Code 128, 2of5, MSI, Code 39
- Wand, Magstripe, CCD Slot Badge or Laser Scanner
- **Top Rated by Independent Review**
- Complete with Steel Wand – **$399**
- Complete MagStripe Units from – **$219**

Portable Bar Code Readers

for PC,XT,AT,PS/2,Macintosh, and Serial Interface Computers



- Battery Operated Reader — 3 AA Cells
- 64K or 256K memory
- Keyboard or Serial upload
- XMODEM upload
- Download Tables
- 2 built-in inventory programs
- UPC/EAN, 128, 2of5, Code 39
- Complete 64K Reader with Laser – **$1734**
- Complete 64K Reader with wand – **$799**

Ordering is Easy!

- Same Day Shipping • USA Made
- Free UPS Blue in USA
- Qualified P.O.'s Accepted
- Free "800" Support
- 30 Day Money Back Guarantee

Call 408-458-9938 or Call Toll Free

800-345-4220

In Europe call information for Toll Free numbers to our Swiss Office or call 71 87 51 15 in Schweiz.

---

variant microsystems

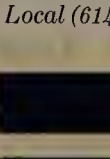
...Where Quality Counts

BAR CODE AND MAGNETIC CARD ACCEPTED SIMULTANEOUSLY

- For XT/AT, PS/2, 286/386/486 PCs, RS-232/Scancode terminals
- DOS/UNIX/PC-MOS compatible
- 10 year warranty on readers
- 30 day moneyback guarantee

Made in USA

CCD with Decoder & Bar Code Printing Software - $485



46560 Fremont Blvd., #105
Fremont, CA 94538
(510)440-2870 • (510)623-1372 (FAX)
(800)666-4BAR (Orders)

MasterCard VISA AMERICAN EXPRESS

CIRCLE 468 ON READER SERVICE CARD

FACT:

ADD RED AS A SECOND COLOR. INCREASE RESPONSE BY 41%.

COMPUTER INSURANCE

SAFEWARE

Insures your computer. Full replacement of hardware, media & purchased software. As low as $49 yearly. Covers fire, power surge, and accidental damage. Now available in Ontario Province, Canada! Call for immediate coverage or information

1-800-848-3469

SAFEWARE The Insurance Agency Inc
2929 N. High St., PO Box 02211
Columbus, OH 43202
Local (614) 262-0559

Advertising Age Reports:

PC WORLD's *ad sales jumped 23.3% during last year's "recession".*

Why? Because products sell when advertising in these pages. Every issue, every day, in good years and bad, PC WORLD *works.*

Contact Catalog sales today: 800/262-9885

COMPATIBLE READER SYSTEMS

Leaders in creative technology

CALL TOLL FREE 800-217-4307

- No software changes required
- 1, 2 or 3 input devices per reader
- Wand, swipe, ccd, laser, magnetic
- Access control readers
- RS-232 readers
- Portable MS-DOS units
- User configurable
- Starting at $179

Orders & Information Box 353 Maynard, MA 01754

CIRCLE 404 ON READER SERVICE CARD

DATA/DISK CONVERSION

SCANNING CONVERSION DUPLICATION

(708) 858-4566

(800) 860-1033

- Data Entry
- Custom Programming
- Data Management
- Bar Code Conversion
- CD ROM Development

Free Tests and Quotations 24 Hour Turn-Time

Media Conversion

will scan any font or typestyle, convert any disk or tape and make duplicates any size or quantity

MEDIA CONVERSION corp

Chicago and Glen Ellyn Locations

CIRCLE 515 ON READER SERVICE CARD

DATA CONVERSION

If you want the most complete conversion services in the industry, just call...

(800) CONVERT

Capabilities include over 4000 formats

PIVAR COMPUTING SERVICES, inc.®

165 Arlington Heights Rd. #W
Buffalo Grove, IL 60089
(708) 459-6010

DISKS

DUPLICATION FROM $.49 HIGHEST QUALITY MEDIA

MSDOS duplication from **$.49** (5.25") and **$.80** (3.5"). Prices go even lower as you continue to order!

- Duplication + 100% Verification
- Custom Labels/Sleeves/Mailers
- Custom Packaging & Assembly
- Colored Media Available
- Special Rates For Demo Software & Site Licensing
- Educational Discounts Available
- 24 Hour Turn-Around
- Guaranteed Products

800-255-3142

Diversified Systems Group, Inc.
PO Box 1114, Issaquah WA 98027

CIRCLE 448 ON READER SERVICE CARD

Software

DISK COPY SERVICE

FORMATTED DISKETTES
BASF, VERBATIM, SONY

WITH FORMAT	QTY 250 MIX & MATCH	WITHOUT FORMAT
$.38	5.25" DS/DD	$.33
$.52	5.25" DS/HD	$.42
$.59	3.50" DS/DD	$.49
$.89	3.50" DS/HD	$.79

- **FREE FORMATTING** on First Order
- **TYVEC SLEEVES** Included (5.25")
- **COLORED MEDIA** Please Add $.05
- **VOLUME DISCOUNTS** Available
- **SAME DAY** Shipping
- **MONEY BACK GUARANTEE**

800-255-3142
Diversified Systems Group, Inc.
PO Box 1114, Issaquah WA 98027

CIRCLE 422 ON READER SERVICE CARD

Software Production

- Full packaging services
- Duplication, all formats
- EVERLOCK copy protection
- Label and sleeve printing
- 48 hour turn around
- Fulfillment and drop shipment
- Consultation and guidance

Star-Byte, Inc.
2880 Bergey Rd., Hatfield, PA 19440
800-243-1515

CIRCLE 477 ON READER SERVICE CARD

SUPPLIES

TONER
Remanufactured cartridges for HP, Apple, etc. Exchange Price
$36.50
LASER QuipT®
10300 Bren Road East
Minnetonka, MN 55343
VISA **800-777-8444** MC, COD

CIRCLE 429 ON READER SERVICE CARD

TONER! New & Remanufactured toner cartridges & other supplies for laser printers!

RIBBONS! New and Reloaded ribbon cartridges for impact printers!

ink jet refills!

- RECYCLE & SAVE up to 70% on printer supplies!
- Friendly service & great products for over 20 years.

CALL FOR FREE SUPPLIES CATALOG
800-426-8196
We buy empty toner cartridges.
WILLOW

CIRCLE 492 ON READER SERVICE CARD

TONER RECHARGE

Quality Toner Cartridges
• New • Remanufactured • Recycled
• Apple, Canon, HP, IBM, etc.
• Prices Starting At $25
• We Buy Empties – Call

SAVE THE EARTH
Quality Recharge Co.
105 Loughborough
St. Louis, MO 63111
FREE BROCHURE
1-800-238-2333

CIRCLE 501 ON READER SERVICE CARD

FACT: *Each PC WORLD subscriber influenced software purchases of $19,587 in 1991 alone.*

BUSINESS APPLICATIONS

UPS Shipping Software
Direct interface to Macola, DacEasy, RealWorld, Great Plains and Platinum. Used as TSR can work with almost any software. Also works great stand-alone. Computes zone & charges. Prints Manifests, COD tags, shipping labels, etc. Optional 100WT, GSV, RPS, USPS, FedEx, scale intf. Only $249, network $449. Gtd UPS acceptance. 60-Day money back. Free trial offer.
V-Technologies
P.O. Box 6261
Wolcott, CT 06716
(203) 879-6960 • Fax (203) 879-6962

TimeWise for DOS Computers
A time, billing and productivity management system designed for organizations which account for their time. Time Wise helps track every detail of job management from prospecting through scheduling, time and material costing, billing & analysis, 60 Day Trial version for $49.00 plus S&H
1-800-795-9074 (US and Canada)
Dynamic Software Solutions Inc.
177 Telegraph Road. Unit #447
Bellingham, WA 98226
Product of David Berman Developments

CHURCH APPLICATIONS

CHURCH SOFTWARE
Discover for yourself why more churches are choosing **PowerChurch Plus.®**
Try out the leading membership and accounting package.
Call today for your **FREE** full-working **DEMO**.
F1 SOFTWARE, 208 Ridgefield Drive, Asheville, NC 28806
800/486-1800

CIRCLE 482 ON READER SERVICE CARD

Church Management Systems
Expect the best!

- *Outstanding Reporting*
- *Superior Support*
- *Integrated Modules*
- *Over 1500 Users*
- *Free Preview Disk*

1-800-247-8044
TSL - 3300 Bass Lake Road, -#304
Brooklyn Center, MN 55429
FAX 612-566-2250

CIRCLE 415 ON READER SERVICE CARD

Church Partner
Written by Computer professionals involved in church management. Skilled users love its power, depth and flexibility. Novices love its ease of use. 13 optional modules with support and upgrade. For IBM compatible and LANs. Object oriented graphic user interface, pop-up menus, windows mouse compatibility and more.
Software by Summit Systems Inc.
Suite 121, 16 Berry Hill Road
Columbia, SC 29210 USA
803/798-9749, 800/228-5857
Fax: 803/731-0349

DATA ENTRY

Viking Data Entry
Professional Quality Software
- Used by U. S. Census
- Advanced Validation
- Sequential/ISAM files
- MS/DOS, UNIX, XENIX, VMS, AIX
- Technical Support
- Re-key verify

Viking Software Services
4808 E. 67th St. Ste. 100
Tulsa, OK 74136
918/491-6144 FAX: 918/494-2701
800/324-0595

Replace dedicated data input systems
Front-end mainframe applications

KeyEntry III®
- LAN or stand-alone environments
- ScreenPainter and MenuManager included
- Batch Control System and Reformat utility
- Spanish, German, and French versions
- Outstanding customer support
- Thousands of users worldwide
- OS/2 version

800-533-6879
FREE DEMO DISK AVAILABLE TO QUALIFIED COMPANIES!
SCS
SOUTHERN COMPUTER SYSTEMS, INC.
(205) 251-2985 • FAX (205) 322-4851
In UK: SCS Europe, Ltd 0753-36550/ FAX 0753 36765

DATA ENTRY

FLOW CHARTING

MAIL ORDER

Mail Order Manager (M.O.M.)™

America's most popular, complete, and affordable solution for the mail order business - order entry/review, credit card processing with draft capture, UPS manifesting, profit analysis, accounting, telemarketing, list management. Clipper compiled, dBase III + files. Single and Multi-user versions. Find out why more people buy MOM after comparing! Call for demo kit.

Dydacomp Development Corporation
150 River Road, Suite N1, Dept. PCW
Montville, NJ 07045
(800)858-DMOM (201) 335-1256

FACT:

23% *of* PC WORLD's *subscribers purchased PC* ***software*** *from mail-order companies last year.*

EDUCATION

BS & MS
In Computer Sciences

- ALL COURSES BY CORRESPONDENCE.
- Increase your earning power.
- Join students from leading computer companies.
- Most courses fully interactive.

AMERICAN INSTITUTE COMPUTER SCIENCES

For free information write
2101-WO Magnolia Ave.
Suite 200
B'ham, AL 35205 USA
or call 1-800-767-2427

PC WORLD *DELIVERS THE BUYERS YOU NEED TO REACH!*

Study after study has proven that managers proficient with PCs now control the business PC buying process. Make sure your advertising gets maximum exposure in your best target market.

MEDICAL

Medical Systems with ECS

PPM offers a complt. line of med SW from simple ins. claims proc. to A/R mgt.
PC CLAIMS PLUS- claims proc. w/ECS to 100+ major ins. carriers - 30 day MB guar
THRESHHOLD- complete A/R, Pt. Bill, Comprh. practice mgt stats.
CLAIM NET- Nationwide elctrnc claims clearinghse transmits to 100+ ins. carriers. SW starts at $649. Dealer inquiries welcome

Physicians Practice Management
350 E. New York
Indianapolis, IN 46204
800/428-3515, 317/634-8080

FINANCIAL

Loan-Amortization

EXEC-AMORT. Replace Desktop Financial Calculators, Avoid Inaccuracies, Quit Using Your Spreadsheet, Store Loans to Disk, Solve for PV, FV, I, PMT, N. Easy to read amortization reports, fixed & ARM's, APR's per Reg Z, Points & Fees, Balloons, irregular & skipped payments. $149.95 US + $5 s/h. Int'l add $25

ELECTROSONICS
36380 Garfield, Suite 1
Fraser, MI 48026 USA
800-858-8448, 313-791-3010 fax
Int'l phone: 313-791-0770

FOREIGN LANGUAGE

CIRCLE 481 ON READER SERVICE CARD

MANUFACTURING

Over 4,000 Manufacturing Users!

Manufacturing inventory control, multi-level BOM's integrated purchasing, BOM-Driven transfers with explosion/implosion. MRP with production scheduling, work orders, costed BOM. $1995 Inventory, $800 MRP with money-back guarantee. Feature packed demo disk prints sample reports - just $5 (use V/M/A).

Microcomputer Specialists, Inc
P.O. Box 795, Woodstock, Vermont, 05091 Call Toll Free 1-800-833-1500

Medical Billing Made Easy

Medsoft can handle your office NOW, and GROW with your practice. Over 1500 installations and 10 years experience means we are the experts.
Medsoft's FoxPro Sierra Line offers:

- Custom versions: MEDICAL, DENTAL, ANESTHESIA, CLINICAL
- Flexible - Used by All specialties
- Automatically Generates Insurance
- Electronic Claims
- COMPETITIVELY PRICED

FREE Demo Disk. Dealers Welcome! Source code available.

Pacific Medsoft, Inc
P.O. Box 7049 (925 N. Lake Blvd, Suite B-301) Tahoe City, CA 96145-7049
800/343-5653, 916/583-2994,
Fax 916/583-1532

MAINTENANCE MANAGEMENT

Maintenance & Inspection

An integrated maintenance management system, including parts inventory, with clients in Fortune 500 companies, utilities, hospitals, schools, manufacturing & service industries, etc. The online system provides operational, planning & analytical reports, such as work orders, schedules, skill & inventory requirements, budget reports & reports that summarize history of work performed.

Penguin Computer Consultants
PO Box 20485
San Jose, CA 95160
408/997-7703, FAX: 408/927-0570
800/521-0545

FACT:

ADD RED AS A SECOND COLOR. INCREASE RESPONSE BY 41%.

MAILING PROGRAMS

The Mail Order Wizard

Complete management system for a catalog, inbound telemarketing, or mail order company. Order processing, inventory mgt, ad forecasting, sales/banking, list mgt, modem charge approval, EDC, UPS manifest w/scale interface. Single and Multi User Systems. Inbound/Outbound Editor's choice.

Haven Corporation
1227 Dodge Ave., Dept. W693
Evanston, IL 60202
800/676-0098, 708/869-3434

MUSIC

SongWright V

MUSIC PROCESSOR prints professional sheet music, songs, scores with text, chords, dynamics. Compose, edit, record, play, transcribe, copy, transpose, extract import, publish - all in standard notation. Symbol editor/librarian. PC, MIDI/AdLib, or SMF entry & playback. Matrix/laser/Deskjet printers. $119.95+$5 s/h. Free sample output.

SONGWRIGHT SOFTWARE
7 Loudoun Street, S.E. Ste 5B
Leesburg, VA 22075
1-800-877-8070, 703-777-7232j2

ON-LINE SERVICE

Where Adults Come To Play!

ODYSSEY BBS

Join The Thousands Of Ladies And Gents Around The World Who Have Discovered America's Leader In Online Adult Entertainment Where YOU Create The Fun! And It's Only On Odyssey!

For Modem Info, Signup Or A Local Number From Over 850 Cities Call: **818 358-6968**

CIRCLE 411 ON READER SERVICE CARD

RESTAURANT/POINT OF SALE

ROUND TABLE

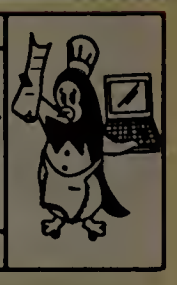
One West Loop South Suite 801 Houston, Tx 77027

RoundTable RMS Restaurant POS

Controls Food and Labor Costs, Security, Point Of Sale, Timeclock, Network Option. Supports Cash Drawer, Receipt & Kitchen Printers. Full Reporting. IBM Compatible

(800)324-2388 (713)622-9841

$495 Easy Restaurant Software $495



CIRCLE 435 ON REAOER SERVICE CARO

Best Files in the U S A !

Channel 1®

■ 200 new Shareware programs every day ■ Music Graphics Business/Finance Windows Adult ■ INTERNET E-Mail and 2500+ Newsgroups ■ No obligation Special FREE downloads Area

Over 3,000,000 calls! 8-N-1 **617-354-3230** 2400 and v.32/v.32 bis

CIRCLE 424 ON READER SERVICE CARD

SCHOOL APPLICATIONS

School Partner

FACT: This system costs a fraction of lesser systems,and does more! our system capabilities include:

- Teacher & Student Medical Records
- Classes, Rosters, Attendance
- Billing & Receivables
- General Ledger, Payables, Payroll
- And More

FOR: IBM Compatibles and Networks

We offer ongoing Technical Support, and openly share ideas.

Summit Systems, Inc.
16 Berry Hill Rd, #121
Columbia, SC 29210 USA
Fax 803-731-0349
Phone 800-228-5857 803-798-9749

STATISTICS

NCSS 5.x Series - $125

Easy-to-use menus & spread sheet. Multiple regression. T-tests. ANOVA (up to 10 factors, rep. measures, covariance). Forcasting, Factor, cluster, & discriminant analysis. Nonparametrics. Cross Tabulation. Graphics: histograms, box, scatter, etc. Reads ASCII/LOTUS. Many new add-on modules.

NCSS
329 North 1000 East
Kaysville, UT 84037
Phone: 801-546-0445
Fax: 801-546-3907

PUBLIC DOMAIN/ SHAREWARE

S2O2O SOFTWARE

SOFTWARE TWENTY TWENTY

OUTSTANDING SOFTWARE YOU CAN ROAD TEST AT NO CHARGE !

MATH TUTOR FONTS GENEALOGY CHILDRENS EDUCATION CLIP ART LOTUS 123 CLONE PC-FILE V6.5 DOS TUTORS STOCK CHARTING SCREEN SAVERS FLOWCHARTER GAMES WINDOWS AUTOMENU PC-WRITE PC-KEY DRAW SOLVEIT WORDPERFECT TUTORS UTILITIES

UNLIMITED FREE DISKS — FREE TECHNICAL SUPPORT

UNCONDITIONAL MONEY BACK GUARANTEE

PRICED AS LOW AS $1.99 PER DISK

1-800-800-3122

CIRCLE 500 ON READER SERVICE CARD

REAL ESTATE

Property Management

Rental-Ease. Tracks tenants, income and expense, repairs and maintenance and much more. Guaranteed to be the easiest and fastest property management program available at any price. Others claim ease of use, see our demo and decide for yourself.

Versions for owners, professionals, networks. $395 to $1295. Free brochure, demo $10

Strategic Office Systems
688 North 500 West #61
Mt. Pleasant, UT 84647
800/942-6784 or 801/462-2130

• Property Mgt Plus/93 •

New version which looks up tenants & posts rent by Tenant Name Prints. Bank Deposit Slips, Rent Statements, & Automatic Checks. Reports. Late Rents, Vacancies & Expired Leases. Posts Management Fees, Pays Owners & does 1099s. Saves up to 80% of accounting time & is the EASIEST system to use! Multi-User version available.

Realty Software
133 Paseo de Granada
Redondo Beach, CA 90277
310/373-5838 or 801/649-6149

Property Management

Comprehensive software for managing residential, commercial, condos & more. Three versions: Basic PM for owner/manager-$495, Deluxe PM for professional management-$1,195, Multi-User with Novell network compatibility-$2,395. Includes check writing, recurring expenses, G/L, management reporting.

Yardi Systems, Inc.
819 Reddick Street
Santa Barbara, CA 93103
805/966-3666

SURVEYS

The Survey System

Analyzes: marketing, public opinion, customer satisfaction, employee attitude surveys. Handles mail, personal, phone, scanner, disk-by-mail or computer interviews. Records verbatim text and actual voice answers. Graphics, network version, user friendly. Free support.

Creative Research Systems
140 Vista View - Ste 101
Petaluma, CA 94952-4728
Ph (707)765-1001
Fax (707)765-1068

NEW StatPac Gold IV

Professional's choice for survey & marketing research. Covers questionnaire design, sampling, CRT & telephone interviewing, basic analyses & presentation quality graphics. Includes frequencies, tabs, banners, descriptives, t-tests, verbatim coding, etc. Advanced statistics available. Free brochure.

StatPac Inc.
4532 France Ave. South
Minneapolis, MN 55410
TEL: (612) 925-0159
FAX: (612) 925-0851

FACT: 61% of PC WORLD subscribers purchased software from mail order firms.

UTILITIES

MATH ACCELERATOR

- 387/487 emulation for 386 and 486SXPC's
- Up to 400% faster graphics, CAD, etc. for PC's w/o a math chip.
- Run all CAD, Graphics, FEA, games, etc. without a math chip.
- DOS, Windows, DOS Extender, and EMM compatible.
- Uses no DOS memory.
- Only $25
- Call for a FREE working demo of Q387

QuickWare
PO Box 684652, Austin, TX 78768
Voice 24hrs (512)-280-6707
BBS (512) 292-1212 (8N1)
Also on CIS, at IBMHW, AOL, etc.

FREE IBM & MAC SOFTWARE CATALOG

32 Pages! ASP Member

SOFTSHOPPE
P.O. Box 247
ARTESIA, CA 90701
Tel: (310) 802-1523
FAX: (310) 802-1494

Toll-Free—24 Hrs.
1-800-851-8089

CIRCLE 512 ON READER SERVICE CARO

99¢ SHAREWARE SPECTACULAR

FREE CATALOG

OVER 600 PROGRAMS

NO Minimums, NO Gimmicks, NO Clubs

Business, Windows, Games, Education

24-Hour, Toll Free Ordering

SHAREWARE EXPLOSION CD-ROM – $49

Over 5,000 Programs – Menu Driven

We Carry a Full Line of Graphics CD-ROMS

S Software, 2880 Bergey Rd., Dept 600BP
Hatfield, PA 19440 • (215) 997-2470

CIRCLE 405 ON READER SERVICE CARD

REMOVE HARDWARE LOCKS

Protect your investment!

Don't wait for your lock to get lost, stolen or fail and render your program useless costing you $$$$

Our SAFEKEY'S are guaranteed to unlock the following programs:

MaxRoute	Pads 2000	3D-Studio
MasterCam	CadKey	Topas
MicroStation	Rio	& others

From $399 plus S&H

(609) 390-2799

VISA Fax: (609) 390-3750 MasterCard

IMAGINE THAT

One Evergreen, Seaville, NJ 08230

CIRCLE 486 ON READER SERVICE CARD

FREE PRODUCT INFORMATION PC WORLD

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

PHONE ( ) FAX ( )

INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520

☐ Check this box for your subscription to *PC WORLD*. You will be billed $19.97 for a 1-year (12 issue) subscription (U.S. only).

Circle the number corresponding to the product or product category you need to know more about. Mail or fax the completed card today. Manufacturers will send product information directly to you. Fax to (413) 637-4343.

PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

PRODUCT CATEGORY INFORMATION 9/93

For information on all of the products mentioned in an article or an entire category of advertised products, circle the appropriate number below.

Editorial Features (see article for numbers)

901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920

Advertised Products

951 Desktop computers
952 Notebook computers
953 DTP/Presentation software
954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

September 1993 This card expires January 13, 1994 L1

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

Free Product Information

For quicker response, fax to (413) 637-4343.

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 758 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Product Information Center
P.O. Box 5330
Pittsfield, MA 01203-9871

FREE PRODUCT INFORMATION PC WORLD

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

PHONE ( ) FAX ( )

INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520

☐ Check this box for your subscription to *PC WORLD*. You will be billed $19.97 for a 1-year (12 issue) subscription (U.S. only).

Circle the number corresponding to the product or product category you need to know more about. Mail or fax the completed card today. Manufacturers will send product information directly to you. Fax to (413) 637-4343.

PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

PRODUCT CATEGORY INFORMATION 9/93

For information on all of the products mentioned in an article or an entire category of advertised products, circle the appropriate number below.

Editorial Features (see article for numbers)

901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920

Advertised Products

951 Desktop computers
952 Notebook computers
953 DTP/Presentation software
954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

September 1993 This card expires January 13, 1994 L3

Free Product Information

For quicker response, fax to (413) 637-4343.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 758 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Product Information Center
P.O. Box 5330
Pittsfield, MA 01203-9871

FREE PRODUCT INFORMATION PC WORLD

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE ( ) _____ FAX ( ) _____

INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520

☐ Check this box for your subscription to *PC WORLD* You will be billed $19.97 for a 1-year (12 issue) subscription (U.S. only).

Circle the number corresponding to the product or product category you need to know more about. Mail or fax the completed card today. Manufacturers will send product information directly to you. Fax to (413) 637-4343.

PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

PRODUCT CATEGORY INFORMATION 9/93

For information on all of the products mentioned in an article or on entire category of advertised products, circle the appropriate number below.

Editorial Features (see article for numbers)

901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920

Advertised Products

951 Desktop computers
952 Notebook computers
953 DTP/Presentation software
954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

September 1993 This card expires January 13, 1994 L2

Free Product Information

For quicker response, fax to (413) 637-4343.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 758 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Product Information Center
P.O. Box 5330
Pittsfield, MA 01203-9871

PC WORLD

PUBLISHER Richard J. Marino
Assistant to the Publisher Colette Comish

ADVERTISING SALES

Senior Vice President, National Accounts Director
Bernard J. Theobald, Jr.

Assistant to the Senior Vice President
Patricia Owen

Vice President, Director of Advertising
Jeff Edman

Assistant to the Director of Advertising
Kate Comfort Harr

EAST

Eastern Advertising Director
Bob Ostrow (508/820-0440)

Administrative Assistant
Ellen Sanderson

Mid-Atlantic/Manhattan
John Grogan, Senior Account Manager (201/587-0090)

New England/Ohio/Michigan/Eastern Canada
Michael Welsh Carroll, Account Manager (508/820-0440)

Southeast/Pennsylvania
Judy Sutter, Senior Account Manager (404/394-0758)

East
Michael Harwayne, Account Representative (210/587-0900)

MIDWEST

Midwest Advertising Director
Mark Taussig (708/827-4477)

Administrative Assistant
Tammy Torp

Midwest/Texas
Harvey Diamond, Senior Account Manager, National Direct Account Manager (214/233-3492)

Midwest
Duane Hampson, Account Representative (415/243-0500)

NORTHWEST

Northwestern Advertising Director
Bob Carrigan (415/243-0500)

Northern California
Corinne Cox, Account Manager (415/243-0500)

San Jose, California
Susan Simmons, Senior Account Manager, Director of Strategic Markets (415/243-0500)

SOUTHWEST

Southwestern Advertising Director
Greg Mason (415/243-0500)

Administrative Assistant
Casady Rutter

Southern California, (San Diego) Colorado/Idaho/Nevada/Utah/New Mexico/Arizona
Lisa Crutchfield, Account Manager (714/250-8081)

Southern California (Los Angeles County/Orange County)
Bill Hanck, Account Manager (310/312-8008)

West
Sandie Wade, Account Representative (415/243-0500)

LOTUS EDITION ADVERTISING SALES
Kevin Normandeau, Account Representative (508/820-8113)

PC WORLD CATALOG
(800/262-9885)
Catalog Manager Pat Fales
Eastern Account Manager Chris Kimball
Western Account Manager Janet Sawyer
Coordinator Sally Naylor

PC WORLD ACTION CARDS
Account Representatives
Kevin Normandeau (508/820-8113)
Leslie Piper (415/243-0500)

CIRCULATION, MARKETING, RESEARCH

Senior Vice President
Heather Martin Maier

Subscription Director David Ball

Senior Promotion Manager
Francesca Davies

Circulation Business Manager Noël White

Promotion Manager Ellen DiMatteo

Promotion Coordinator Jane Kratochvil

Renewal and Billing Coordinator
David Cobb

Circulation Assistant Katherine McCarthy

Single Copy Sales
Kemco Publishers Services (603/924-0224)

Marketing Manager Alan Abrams

Public Relations Manager Lee Doyle

Reprints Coordinator Scott Shores

Marketing Events Manager Sandy Wong

Administrative Assistant Krista Alvarez

Research Director Cheryl Curbow

Research Manager Thomas Gewecke

PRODUCTION

Vice President, Manufacturing
Linda Manes Goodwin

Senior Production Manager
Nadia Maudsley

Advertising Information Manager
Kevin Octavio

Assistant Production Manager
Kathy Badertscher

Advertising Production Coordinator
Francis Aviani

Production Coordinator Nancy Jonathans

Advertising Information Assistant
Erin Wayman

HUMAN RESOURCES

Director, Human Resources
Richard Willoughby

Administrator, Human Resources
Thalia Ohara

Human Resources Assistant Maria Chico

ADMINISTRATION

Director of Finance Vicki Peilen

Director of Information Services
Walter J. Clegg

Corporate Business Manager
Christina Spence

Accounting/Operations Manager
Pat Murphy

Accounting/Facilities Manager
Michelle Reyes

Senior Financial Analyst
Madeleine Buckingham

Special Assistants to the President
Pete Deemer, Thomas Hsieh, Jr., Scott Laughlin, Melissa Riofrio

Assistant to the President Kelly Milan

Advertiser Index A-Z

Get more information—circle the appropriate number on the reader service card.

Reader Service Number		Page Number
67	ACT!	205
9	Advanced Logic Research	11
45	American Power Conversion	79
–	Anthro Corp.	36
–	Apple	281-282
27	Arabesque Software	259
8	Arlington Computer Products	284
–	AST	26-27
5	ATI	271
36	Attitude, Inc.	273A
32	Austin Computer Systems	275
10	Austin Computer Systems	191-194
4	Axik Computer Inc.	255
193	Azeena	294G
41	Best Power Technology	294F
13	Borland International	34
17	Caere Corp.	115
215	Caere Corp.	195
21	Caere Corp.	241
18	Coactive Computing Corp.	250-251
35	Compaq Computer Corp.	222-223
83	Compaq Direct	216-219
14	CompuDyne	266-269
33	CompuServe	16
39	Computer Associates	22
26	Computer Associates	265
51	Computer Associates	273B
68	Computer Discount Warehouse	285-288
65	Comtrade	294B-294C
49	Conner	95
93	Corel Systems Corp.	85
56	Cougar Mountain Software	294H
–	Dell Computer Corp.	C5-C8, 184-185
60	Digital Equipment Corp.	226-227
–	Epson America Inc.	92-93
101	Ergodyne	30-33
82	Executrain	319
235	Fifth Generation	14
73	First Source International	294D
153	Fujitsu Computer Products	59
–	Gateway 2000	157-160, 237-240
–	Gateway 2000	51, 40-50
–	GraphixZone	316
110	H. Co. Computer Products	294E
79	Haventree	101
1D5	Hayes Microcomputer	77
–	Hewlett Packard	117-119, 60-61
108	IBM Corp.	138-139
133	IBM Corp.	63
123	IBM Corp.	279
142	IBM PC Co.	10
127	IBM Personal Software Products	129-134
132	In Focus Systems	249
121	Insight Software	298-299
115	Intel	13
1D9	Intel	262-263
1D6	Intel End User Division	146-147
118	Kinesis	275B
–	LA Trade	289
2D6	LeamKey, Inc.	292-293

PC World is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 190 computer publications in 62 countries. Forty million people read one or more International Data Group publications each month. International Data Group's publications include: **ARGENTINA**'s Computerworld Argentina, Infoworld Argentina; **ASIA**'s Computerworld Hong Kong, Computerworld Malaysia, Computerworld Southeast Asia, PC World Hong Kong, PC World Malaysia, PC World Singapore; **AUSTRALIA**'s Australian Macworld, Australian PC World, Computerworld Australia, IDG Sources, Network World, Reseller; **AUSTRIA**'s Computerwelt Oesterreich, PC Test; **BRAZIL**'s Computerworld, Mundo IBM, Mundo Unix, PC World, Publish; **BULGARIA**'s Computerworld Bulgaria, Ediworld, PC & Mac World Bulgaria; **CANADA**'s Direct Access, Graduate Computerworld, InfoCanada, Network World Canada; **CHILE**'s Computerworld, Informática; **COLOMBIA**'s Computerworld Colombia; **CZECH REPUBLIC**'s Computerworld, Elektronika, PC World; **DENMARK**'s CAD/CAM World, Communications World, Computerworld Danmark, Lotus World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Windows World; **ECUADOR**'s PC World; **EGYPT**'s Computer World (CW) Middle East, PC World Middle East; **FINLAND**'s MikroPC, Tietoverkko, Tietoviikko; **FRANCE**'s Distributique, Golden Mac, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Télécoms & Reseaux; **GERMANY**'s Computerwoche, Computerwoche Extra, Computerwoche Focus, Computerwoche Karriere, Information Management, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Unit; **HUNGARY**'s Alaplap, Computerworld SZT, PC World; **INDIA**'s Computers & Communications; **ISRAEL**'s Computerworld Israel, PC World Israel; **ITALY**'s Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Italia, PC World Italia; **JAPAN**'s Computerworld Japan, Macworld Japan, SunWorld Japan, Windows World; **KENYA**'s East African Computer News; **KOREA**'s Computerworld Korea, Macworld Korea, PC World Korea; **MEXICO**'s Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows; **THE NETHERLANDS**' Computer! Totaal, LAN Magazine, MacWorld; **NEW ZEALAND**'s Computer Listings, Computerworld New Zealand, New Zealand PC World; **NIGERIA**'s PC World Africa; **NORWAY**'s Computerworld Norge, C/World, IDG Direct Response, Lotusworld Norge, Macworld Norge, Networld, PC World Ekspress, PC World Norge, PC World's Product Guide, Publish World, Student Data, Unix World, Windowsworld; **PANAMA**'s PC World; **PEOPLE'S REPUBLIC OF CHINA**'s China Computerworld, China Network World, Electronics International, PC World China; **IDG HIGH TECH BEIJING**'s New Product World; **IDG SHENZHEN**'s Computer News Digest; **PERU**'s Computerworld Peru, PC World; **PHILIPPINES**' Computerworld, PC World; **POLAND**'s Computerworld Poland, PC World/Komputer; **PORTUGAL**'s Cerebro/PC World, Correio Informatico/Computerworld, MacIn; **ROMANIA**'s PC World; **RUSSIA**'s Computerworld-Moscow, Mir-PC, Sety; **SLOVENIA**'s Monitor Magazine; **SOUTH AFRICA**'s Computing S.A.; **SPAIN**'s Amiga World, Computerworld España, Comunicaciones World, Macworld España, NeXTworld, PC World España, Publish, Sunworld; **SWEDEN**'s Attack, ComputerSweden, Corporate Computing, Datalngenjoren, Lokala Natverk/LAN, Lotus World, MAC&PC, Macworld, Maxi Data, Mikrodatorn, PC World, Publishing & Design (CAP), Windows World; **SWITZERLAND**'s Computerworld Schweiz, Macworld Schweiz, PC & Workstation; **TAIWAN**'s Computerworld Taiwan, Global Computer Express, PC World Taiwan; **THAILAND**'s Thai Computerworld; **TURKEY**'s Computerworld Monitor, Macworld Turkiye, PC World Turkiye; **UKRAINE**'s Computer World; **UNITED KINGDOM**'s Lotus Magazine, Macworld, Sunworld; **UNITED STATES**' AmigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Desktop Video World, DOS Resource Guide, Electronic News, Federal Computer Week, Federal Integrator, GamePro, IDG Books, Infoworld, Infoworld Direct, Laser Event, Macworld, Multimedia World, Network World, NeXTworld, PC Games, PC Letter, PC World, Publish, Sumeria, SunWorld, SWATPro, Video Event; **VENEZUELA**'s Computerworld Venezuela, MicroComputerworld Venezuela; **VIETNAM**'s PC World Vietnam.

Index

Reader Service Number		Page Number
122	Logitech	96-97
–	Lotus	17-19, 20-21
–	Lotus Books	236
–	Lotus CBT Tutorial	253
–	Lotus Videos	236, 253
126	Lyco Computers	295
169	MAG InnoVision, Inc.	73
161	MapLinx	83
145	Media Vision	245
20	MediaMagic	37
197	MEI Micro Center	25
183	Micrografx	155
–	Microsoft	122-123, 161
–	Microsoft	C2-1
–	Microsoft Press	65
200	MicroSolutions	24
172	MIS Computer Systems	300
160	Mouse Systems	81
143	MouseTrack	246
139	Nisca, Inc.	233
175	NoRad	38
–	Northgate Computer Systems	145, 199
176	nView Corp	28
199	Okidata	111
140	Okidata	162-163
–	Online Access	275A
233	Patton & Patton Software	272
–	PC Connection	206-211
207	PC World Online	273
232	PCs Compleat Inc.	296-297
212	PKWARE	280
177	Presentation Task Force	243
198	ProTec Microsystems	12
202	QMS	143
184	QMS	153
236	Qualitas	109
189	Quarterdeck Office Systems	182-183
–	Radio Shack	197
239	Rose Electronics	258
225	Serif, Inc.	75
220	Texas Instruments	230-231
242	Texas Instruments	171
–	The Computer Book Club	257
257	Toshiba	234-235
148	USA Flex	290-291
193	WinXpress	294G
–	WordPerfect	168-169, 212
238	Worldwide Technologies	294
260	Zeos International, Ltd.	4-7, 8-9

Advertiser Index by Product Category

Get more information—circle the appropriate number on the reader service card.

HARDWARE

Boards/Cards/Chips

5	ATI	271
175	NoRad	38

Communications

105	Hayes Microcomputer	77

Computers

9	Advanced Logic Research	11
–	AST	26-27
10	Austin Computer Systems	191-194
83	Compaq Direct	216-219
14	CompuDyne	266-269
65	Comtrade	294B-294C
–	Dell Computer Corp.	C5-C8
60	Digital Equipment Corp.	226-227
–	Gateway 2000	51
108	IBM Corp.	138-139
127	IBM Personal Software Products	129-134
106	Intel End User Division	146-147
–	Northgate Computer Systems	199
–	Radio Shack	197
148	USA Flex	290-291
251	Zeos International, Ltd.	4-7
–	Gateway 2000	40-50

Desktop Publishing

184	QMS	153

Input Devices

118	Kinesis	275B
122	Logitech	96-97
–	Microsoft	122-123
160	Mouse Systems	81
143	MouseTrack	246

Laptop/Notebook

32	Austin Computer Systems	275
10	Austin Computer Systems	191-194
14	CompuDyne	266-269
–	Gateway 2000	157-160
–	Gateway 2000	237-240
–	Hewlett Packard	117-119
197	MEI Micro Center	25
–	Northgate Computer Systems	145
257	Toshiba	234-235
220	Texas Instruments	230-231
260	Zeos International, Ltd.	8-9

Local Area Network

18	Coactive Computing Corp.	250-251
239	Rose Electronics	258

Monitor

132	In Focus Systems	249
169	MAG InnoVision, Inc.	73
176	nView Corp	28

Multimedia

132	In Focus Systems	249
109	Intel	262-263
145	Media Vision	245
20	MediaMagic	37
200	MicroSolutions	24
–	Radio Shack	197

Other

27	Arabesque Software	259
126	Lyco Computers	295
198	ProTec Microsystems	12

Printer

–	Epson America Inc.	92-93
–	Hewlett Packard	60-61
199	Okidata	111
140	Okidata	162-163
202	QMS	143
184	QMS	153
242	Texas Instruments	171

Power Protection

45	American Power Conversion	79
41	Best Power Technology	294F

Peripheral/Sharing Devices

49	Conner	95
115	Intel	13
239	Rose Electronics	258

Systems

4	Axik Computer Inc.	255
65	Comtrade	294B-294C
121	Insight Software	298-299
172	MIS Computer Systems	300

Scanners/Digitizers

17	Caere Corp.	115
153	Fujitsu Computer Products	59
139	Nisca, Inc.	233
199	Okidata	111
140	Okidata	162-163

Storage/Backup Devices

49	Conner	95
106	Intel End User Division	146-147
200	MicroSolutions	24

SOFTWARE

Accounting/Financial

39	Computer Associates	22
56	Cougar Mountain Software	294H

Database Management

67	ACT!	205
13	Borland International	34
215	Caere Corp.	195
26	Computer Associates	265
161	MapLinx	83

Desktop Publishing

225	Serif, Inc.	75

Graphics

93	Corel Systems Corp.	85
183	Micrografx	155

Integrated Software

–	Microsoft	C2-1

Management

51	Computer Associates	273B

Multimedia

20	Austin Computer Systems	37
109	Intel	262-263

Operating Systems

133	IBM Corp.	63
123	IBM Corp.	279

Optical Character Recognition

21	Caere Corp.	241

Other

36	Attitude, Inc.	273A
–	Dell Computer Corp.	184-185
236	Qualitas	109

Project Management

79	Haventree	101
–	Microsoft	161
233	Patton & Patton Software	272

Presentation Graphics

177	Presentation Task Force	243
–	Lotus	20-21
–	WordPerfect	168-169

Schedule Software

27	Arabesque Software	259

Spreadsheets/Templates/Forms

13	Borland International	34
–	Lotus	17-19

Utilities

235	Fifth Generation	14
212	PKWARE	280
189	Quarterdeck Office Systems	182-183

Windows

67	ACT!	205
193	Azeena	294G
161	MapLinx	83
183	Micrografx	155
193	WinXpress	294G
–	WordPerfect	212
–	WordPerfect	168-169

Word Processing/Aids

–	Lotus	20-21
–	WordPerfect	212
175	NoRad	38

MISCELLANEOUS

Books/Periodicals/Subscriptions

–	Lotus Books	236
–	Microsoft Press	65
142	IBM PC Co.	10

Computer Accessories

–	Anthro Corp.	36
101	Ergodyne	30-33
238	Worldwide Technologies	294

Mail Order

–	Apple	281-282
8	Arlington Computer Products	284
193	Azeena	294G
68	Computer Discount Warehouse	285-288
73	First Source International	294D
110	H. Co. Computer Products	294E
121	Insight Software	298-299
–	LA Trade	289
126	Lyco Computers	295
172	MIS Computer Systems	300
–	PC Connection	206-211
232	PCs Compleat Inc.	296-297
–	The Computer Book Club	257
148	USA Flex	290-291
193	WinXpress	294G

Other

35	Compaq Computer Corp.	222-223

On-Line Services

33	CompuServe	16
–	Online Access	275A
207	PC World Online	273

Training

82	Executrain	319
206	LearnKey, Inc.	292-293
–	Lotus CBT Tutorial	253
–	Lotus Videos	236
–	Lotus Videos	253

Trade Shows

–	GraphixZone	316

Products Featured in Editorial

Get more information—circle the appropriate number on the reader service card.

Accounting

788	BestBooks 1.1.1, Teleware	66
789	DacEasy Instant Accounting 2.0, DacEasy	66
617	Disbursements Manager 1.20, Cheqwriter 1.10; Cheqsys	150
670	FlagShip 5.0, DacEasy	94
674	Great Plains Accounting Version 7, Great Plains Software	94
618	LaserMax, LaserMax Software	151
786	Microsoft Profit 1.0a, Microsoft	66
787	Peachtree Accounting for Windows 2.0, Peachtree Software	66
631	QuickPay 2.0, Intuit	154
615	Timeslips 5, Timeslips Accounting Link; Timeslips	150
616	TimeTrac 93a, Compass/New England	150
632	Zipper Payroll 1.6, SoftCraft	156

Add-On Board

683	AL-1000, Always Technology	232
675	Cardex V41LBV, CardExpert Technology	94
669	GoPrint, AeroComm	91
682	MiniSCSI Plus, Trantor Systems Ltd.	232
650	Renegade 1024, 1280; Appian Technology	72
672	STB Pegasus VL Accelerator Board, STB	94

Antivirus Software

784	Central Point Anti-Virus, Central Point Software	56

Backup Software

632	Central Point PC Tools 8.0, Central Point Software	166
633	Central Point PC Tools for Windows 1.0, Central Point Software	167
664	Fastback Plus 6.0, Fastback for Windows 1.1, Fastback for OS/2, Fastback Express; Fifth Generation Systems	84
779	Fastback Plus 6.0, Fastback Plus for Windows 1.1; Fifth Generation Systems	170
634	Gazelle Back-It 4 1.4, Gazelle Systems	167
635	Gazelle Back-It for Windows 1.2, Gazelle Systems	167
636	Symantec Norton Backup for DOS 2.2, Symantec	170
637	Symantec Norton Backup for Windows 2.2, Symantec	170
638	Sytron Sytos Plus 1.4, Sytron	172

Business Application

658	Business Insight, Business Resource Software	82
659	PlanMaker, PowerSolutions for Business	82

Communications

667	RemoteWare, XcelleNet	86

Compression

663	Stacker 3.1, Stac Electronics	84
665	XtraDrive 3.0, XtraDrive Lite; Integrated Information Technology	84

Computer System

648	Deskstation Evolution rPC401e/100, Deskstation Technology	71
647	Acer AcerFormula 4000, Acer America	71

Index

Reader Service Number — Page Number

612 ALR Evolution IV MPC 4DX2/66 Model 240, Advanced Logic Research 106
613 AST Advantage Plus 486DX2/66, AST Research 106
614 Axik Ace Cache BusinessPro, Axik Computer 107
615 Blackship BLK 486/50LB, Blackship Computer Systems 108
794 Bravo NB 4/25s, 4/25 Color, 4/25s ColorPlus; AST Research 54
616 Compaq Deskpro 4/33i, Compaq Computer 108
617 Compaq ProLinea CDS, Compaq Computer 110
618 Compudyne 486DX2/66 Mini-Tower, CompUSA 110
619 DFI Model 466 MPC, DFI 112
620 Duracom DeskSaver 486/66DX2, Duracom 112
621 Eltech Model 4660VB, Eltech Research 112
651 Epson ActionNote 4000, Epson America 74
622 Gateway 4DX2-66V, Gateway 2000 113
793 HandBook486, ColorBook; Gateway 2000 54
– IBM PS/ValuePoint 466DX2/D Model 6384-WS9, IBM Direct 113
623 Insight 486-33 VL Multimedia Office, Insight Distribution Network 114
624 Keydata 486-Multimedia WindowStation, Keydata 114
625 Micron 466VL Magnum, Micron Computer 116
626 NEC Image 466, NEC Technologies 116
627 Netis N466 VL/MPC, Netis Technology 116
628 Polywell Poly 486-66VZ, Polywell Computers 120
629 Tandy 466 DX2, Tandy 120
630 Tangent Black Box M440, Tangent Computer 124
646 Tangent Carrera 4 Workstation, Tangent Computer 71
652 Thunderbox Multimedia Portable, Lightning Computers 74
631 Tri-Star Tri/Win Multimedia System, Tri-Star Computer 125

Database Management

765 Ace File 2.0, Ace Software 39

Desktop Publishing

780 FrameMaker for Windows 3.0, Frame Technology 186
781 PageMaker for Windows 5.0, Aldus 186
782 QuarkXPress 3.1, Quark 186
783 Ventura Publisher Windows Edition 4.1.1, Ventura Software 186

Disk Drive

– 3.5 Enhanced Rewritable Magneto Optical Drive, IBM 144
603 Cachet System 6, Maximum Storage 144
600 HammerDisk 130, FWB 144
606 Infinity Optical 3.5, PLI 144
767 LF-3000 Magneto Optical Drive, Panasonic Communications & Systems 39
602 Liberty 70MO, Liberty Systems 144
607 MEOD 128, Procom Technology 144
605 PMO-130, Pinnacle Micro 144
611 PST-MO128, Valitek 144
610 RMO-S350, Sony Electronics 144
608 Sierra 128, Relax Technology 144
609 Transporter PC/e, Ricoh 144
604 Vista 256, Ocean Microsystems 144

Display

649 Mitsubishi FS Monitors, Mitsubishi Electronics 72

E-mail

666 Notework 2.0, Notework 86

Entertainment/Game

762 FX 2000 flight control joystick, Suncom Technologies 317
763 The Summoning, Strategic Simulations 317
761 World Circuit, MicroProse Software 317

Fax-Modem

639 WorldCom V.32bis Modem, Western Digicom 96

Financial

662 Financial Workshop, Electronic Arts 76
619 Fixed Asset Pro 1.2, HammerSoft 151
620 Hamlet 2.7, Decision Systems 151
660 MoneyCounts for Windows, Parsons Technology 76
661 Payoff 2.0, Phadean Engineering 76
621 Per%Sense 2.0, Per%Sense 151

Form Generation

653 Delrina FormFlow 1.0, Delrina 78
654 Form Creator, Parsons Technology 78

Graphics

622 Instant Artist, Autodesk Retail Products 152
625 Masterclips, Masterclips 94
623 Rockford 3.0, OsoSoft 152

Image Management

768 Watermark Discovery Edition, Watermark Software 39

Input Device

705 101WN, Honeywell Keyboard Division 214
746 1601/2, Electrone 224
735 25-2001 Combi-Mouse, Radio Shack 220
758 25-2003 Trackball, Radio Shack 224
720 3-Button Serial Mouse, A4Tech 220
736 Aero Plus, Sai Systems and Laboratories 220
726 Alum Mouse, Focus Electronic 220
754 BallPoint Mouse, BallPoint (portable); Microsoft 224
723 City Mouse, Commax 220
741 Colani Mouse, Win Mouse; Moustrak 220
704 Comfort Keyboard System, Health Care Keyboard 214
724 DMS-400x, DFI 220
725 DynaMouse, DynaPoint 220
745 DynaTrak, DynaPoint 224
759 EasyTrak, T2+; Winner Products (USA) 224
700 Electrone 4000, Electrone 6142, Electrone 6200; Electrone 214
706 Erase-Eaze, Keyboard Advances 214
750 Expert Mouse 4.0 Trackball, Kensington Microwave 224
698 FDMC-101 Mechanical, FDMM-101 Membrane, GGMC-101 Mechanical, MDS-101 Membrane; Alps Electric 214
721 Felix, Altra 220
742 First Finger Trackball, A4Tech 224
703 FKB4700 Series, FKB4870 Series; Fujitsu Microelectronics 214
716 Focus 2001, Sai Systems and Laboratories 214
699 G81-1800 Compact Keyboard, Cherry Electrical Products 214
729 Genius Clixes, Genius MouseOne, Genius MouseToo; KYE Int'l 220
752 Genius HiTrak, Genius HiPoint; KYE Int'l 224
727 Honeywell Mouse, Honeywell Keyboard Division 220
728 IMSI Mouse, Pet Mouse, System Mouse; IMSI 220
766 Infonte MP100 Writing Pad, Infonte 39
717 J.M. Keyboard, Sejin America 214
713 Keyboard Deluxe-Membrane, Keyboard Deluxe-Tactile; MicroSpeed 214
702 KeyPro FK-9000, Focus Electronics 214
709 Kinesis Ergonomic Keyboard, Kinesis 214
710 Lexmark Classic Touch, Lexmark Int'l 214
731 Microsoft Mouse 2.0, Microsoft 220
711 MiniErgo, Marquardt Switches 214
732 Mouse Deluxe, MicroSpeed 220
733 Mouse, New Mouse, OmniMouse II, PC Mouse III; Mouse Systems 220
749 Mouse-trak, Itac Systems 224
730 MouseMan Cordless, MouseMan; Logitech 220
722 MousePen Pro, Gulliver, Appoint 220
738 MouseTrax, SIIG 220
714 OmniKey/Ultra-T Keyboard, Northgate 214
747 PC Stylus Combo, IMSI 224
756 PC Trackball II, NewPoint; Mouse Systems 224
755 PC-Trac, WinTrac, MicroTrak Model #PD600; MicroSpeed 224
734 PowerMouse/100, PowerMouse/50, PowerMouse/70, ProHance Serial Mouse; ProHance 220
757 ProHance PowerTrak/100, ProHance PS/2 Trackball, ProHance Serial Trackball; ProHance 224
712 ProKey 124 Keyboard, Maxi Switch 214
748 RB2-300, GPS Marconi Circuit Technology 224
739 RM-2, Winner Products (USA) 220
744 RollerMouse, CH Products 224
737 SMC 24, SMC 34; Sejin America 220
718 Suntouch 101 Enhanced Keyboard, Suntouch Jr.; SIIG 214
707 TE2P Touch Edit Keyboard, TTE Touch Edit Keyboard; Key Innovations 214
697 The Natural, Advance Computer Ergonomics 214
719 The Tony Ergonomic KeySystem, Tony 214
701 The Vertical, Ergonomic-Interface Keyboard Systems 214
743 Thumbelina, Appoint 224
753 TrackMan, TrackMan Portable; Logitech 224
708 Trak101 Keyboard, Flash101 Keyboard; KeyTronic 214
751 TrakMate Wristpad, KeyTronic 224
715 VersaKey, People & Profits 214
740 Zen Infra-red Cordless Mouse, Zeny Computer Systems 220

Legal

624 AgreeMentor 2.3, Jian 152
625 Nolo's Partnership Maker, Nolo Press 152
626 Small Business Advisor 93.3, Ronin Software 152

Mail Order

612 ALR Evolution IV MPC 4DX2/66 Model 240, Advanced Logic Research 106
614 Axik Ace Cache BusinessPro, Axik Computer 107
615 Blackship BLK 486/50LB, Blackship Computer Systems 108
619 DFI Model 466 MPC, DFI 112
621 Eltech Model 4660VB, Eltech Research 112
622 Gateway 4DX2-66V, Gateway 2000 113
– IBM PS/ValuePoint 466DX2/D Model 6384-WS9, IBM Direct 113
623 Insight 486-33 VL Multimedia Office, Insight Distribution Network 114
624 Keydata 486-Multimedia WindowStation, Keydata 114
625 Micron 466VL Magnum, Micron Computer 116
626 NEC Image 466, NEC Technologies 116
627 Netis N466 VL/MPC, Netis Technology 116
628 Polywell Poly 486-66VZ, Polywell Computers 120
629 Tandy 466 DX2, Tandy 120
630 Tangent Black Box M440, Tangent Computer 124
631 Tri-Star Tri/Win Multimedia System, Tri-Star Computer 125

Mailing List Program

627 AccuMail, Group 1 Software 152
628 DAZ-zle, Envelope Manager Software 154
629 PostSave III, Accurate Software 154
630 SoftSpoken Mailer for Windows 1.2, SoftSpoken 154

Mapping Software

638 City Streets: The Electronic Street Guide, Road Scholar 97
673 MapLand, Software Illustrated 94

Miscellaneous

633 CPSLite, Harvey Software 156
671 Microsoft Scenes, Microsoft 94
678 Playmation, Hash Enterprises 97
634 Shippit 1.0, Computer Consulting Group 156
635 Stamps, PC World Online 150
636 WonderBar, Binary Systems 152

Online Service

797 DowVision, Dow Jones Information Services 62
798 Executive News Service, CompuServe 62
799 First, HeadsUp 62
800 Information Advantage, MCI Int'l 62
801 Journalist-Live Page Layout, Ped Software 62
803 News in Motion, WalkSoft 62
802 Newsedge, Desktop Data 62
796 Newsweek Interactive, The Software Toolworks 62
804 Tax News Network, Coopers & Lybrand 62
795 The Daily News Alert, JRA Information Services 62

Personal Information Manager

791 Ecco Professional 1.0, Arabesque Software 56
790 Lotus Organizer 1.0, Lotus Development 56
792 PackRat 5.0, Polaris Software 56

Presentation Graphics

657 WordPerfect Presentations for Windows 2.0, WordPerfect 80

Printer

677 OL830 Plus, OL850; Okidata 96

Printer Accessories

637 Printex Paper Server, Printex Technology 97

Tape Backup

696 3080PK, E3080PK; Wangtek 180
690 Backpack Tape Drive, Micro Solutions Computer Products 180
687 CoreTape Light, CoreTape Light-E; Core Int'l 180
691 FileSafe TD-250, FileSafe 8000Plus (internal), FileSafe 8000Plus (external), FileSafe 8500 IDE, FileSafe SideCar; Mountain Network Solutions 180
694 FileSecure FS250i, FileSecure FS250e; Tallgrass Technologies 180
685 Jumbo 250, Jumbo 250 with KE-1-External Kit, JumboTrakker 250; Colorado Memory Systems 180
689 Memorex Tape Drive Backup System, Memorex Computer Supplies 180
695 MiniVault 250, MiniVault 250E; Tecmar 180
684 Retriever 250 Plus, Alloy 180
692 SDI 250P, SDI 180
693 Summit SE250, Summit SE250 External, Summit SE305 (IDE); Summit Memory Systems 180
688 Tape250 Insider, Tape250 Half Height, Tape250 PC Powered, Tape250 Parallel Port; Inmega 180
686 TapeStor-250MQ, TapeStor-250MQP, TapeStor-250MQT, TapeStor-250MQPT; Conner Peripherals 180

User Group

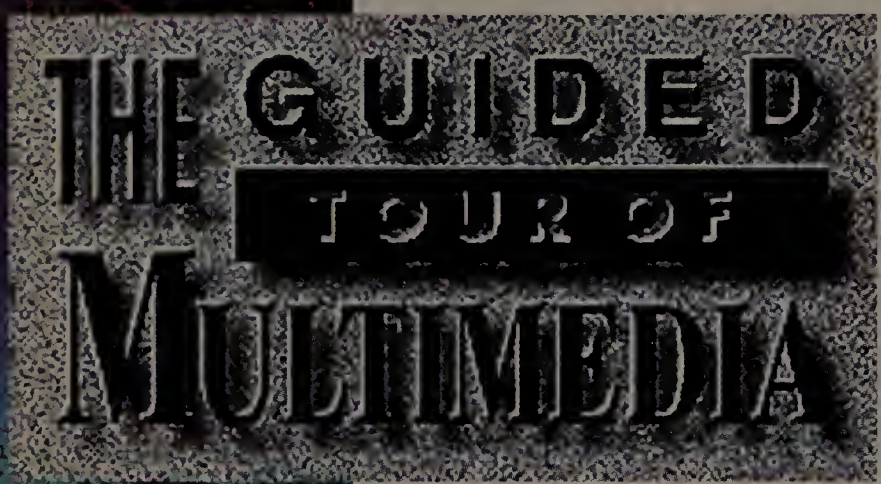
681 Capitol PC User Group, Rich Schinnell 229

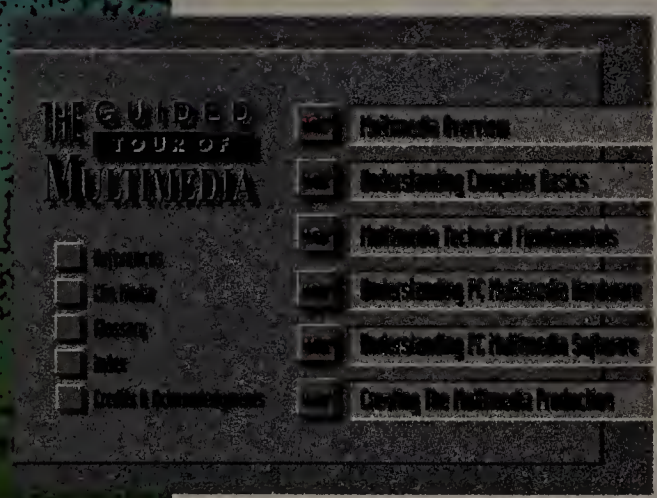
Utility

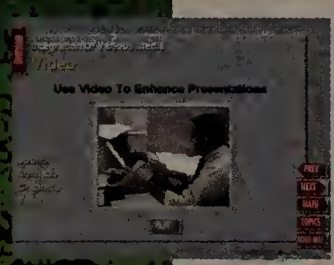
655 AnyView, Binar Graphics 80
644 CleanUp for Windows, Foley Hi-Tech Systems 320
656 Fantastic Recall, Binar Graphics 80
679 FontMinder 1.1.1, Ares Software 252
668 KingCOM, OTC 91
680 Last Resort, Working Software 228
641 More Control, Sloop Software 320
639 Plug-In, Plannet Crafters 320
640 Trash Manager, CheckBox Software 320
642 WinZip, Nico Mak 320

Multimedia Revealed

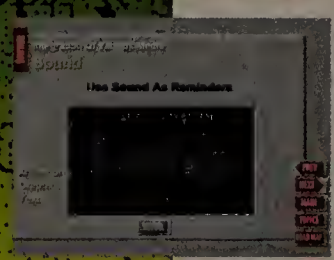
Introducing an exciting new interactive CD



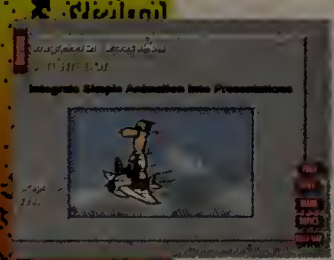




VIDEO
Capture/Playback video



SOUND
Add music and voice-over



ANIMATION
Makes your work fly

MULTIMEDIA WORLD

The first CD-ROM that uses multimedia to teach you about multimedia!

Over 20 hours of fact-packed, interactive multimedia information for beginners and professionals!

You'll experience the exciting world of multimedia first hand. The power, the potential, and the easy, step-by-step ways you can harness this powerful tool for business, education...or just plain fun!

You'll interactively explore:

- The basic fundamentals of multimedia
- In-depth information on multimedia technology
- What kind of hardware and software you'll need
- Easy steps to creating multimedia presentations
- Vast clip libraries of video, graphics, animations, and sounds
- An interactive Table of Contents, Glossary, and Index

The Guided Tour of Multimedia

The world of multimedia at your fingertips.

Your **complete** interactive multimedia resource, compiled and developed by a team of world renowned multimedia experts.

Experience the wonder of multimedia yourself! It's easy to order!

Call 1-800-942-4000

The Guided Tour of Multimedia Just $39.95

(plus applicable taxes and $3.50 for shipping and handling) *Please have your VISA or Master Card ready when you call.*

Or send your check or money order to:
The Guided Tour of Multimedia
914 S. Hoover Street,
Los Angeles, CA 90006

Now Available at:
EGGHEAD SOFTWARE

Here's what you need to run
The Guided Tour of Multimedia

- PC 386SX or better
- Windows 3.1 or 3.0 with extensions
- 4MB RAM recommended
- 30MB hard disk
- VGA display, 256 colors
- CD-ROM drive
- Sound board recommended

PC Multimedia PC

© 1993 Zone Publishing, Inc.

Oil Slicks, Joy Sticks, and Mystics

From the screaming whine of the gearbox to the slight dip you take when you hit the brakes, World Circuit from MicroProse does an amazing job of putting you behind the wheel of a Formula I racer on the Grand Prix circuit. This lifelike simulation is incredibly detailed. In the pits, you practically feel your car going up on jacks, and you count the seconds while listening to your wheels being changed. Back on the track you swear you can smell burning Castrol.

The game includes precise re-creations of 16 Grand Prix courses, from Phoenix to Monaco to Barcelona, and you'll challenge the top cars and racing teams from 1991. Best of all, World Circuit goes a lot deeper into the racing scene than mere sound effects and visuals. To win, you must make complex decisions on everything from tire compounds to gear ratios and brake balance. In fact, you'll need to become an engineer as well as a racing driver.

Learning to pilot one of these highly tuned machines through a grueling series of practices, qualifying laps, and sudden-death races is no trivial task. That's why you'll love World Circuit's quick-start racing aids. If you enable the auto-driving features, your gears and brakes will be controlled automatically, so all you have to do is keep the pedal to the metal and try to make the turns. You can also employ antispin circuitry and an Indestructible mode that keeps you in the race even after a crash. As you get the hang of the controls, you can turn off these aids one by one for a more authentic race. The manual includes detailed maps of each course, complete with recommended gears—and telemetry from the pits helps you make the correct driving decisions.

You can control acceleration, braking, and steering with a mouse (sloppy), the keyboard (highly precise but not very lifelike), or a joystick (the best). And you can play solo, racing against the entire 1991 Grand Prix lineup—or against some friends. In multiplayer mode, the PC stops the action every so often to let you switch, and it declares a winner at the end of the race.

World Circuit's pit stops are just as realistic as the action on the track and just as important—unless you enjoy blowing out your tires at 168 mph.

Most of the action takes place with you in the cockpit, but trackside camera angles, chase views, and instant replays are available too. There's a strange, masochistic pleasure in watching yourself spin out into a multicar catastrophe, and of course roaring into the winner's circle has its own appeal.

State-of-the-Art Stick

These days, most games are designed for a mouse or keyboard interface. But since World Circuit was clearly designed for a joystick, I decided to try out Suncom's state-of-the-art FX 2000. I'm impressed. Mounted on desk-grabbing suction cups, the ergonomically sculptured pistol grip, with its smooth-action trigger, kept me in control no matter how tense (or sweaty) the racing action. Even the tiniest movement of the stick had an instant on-screen effect. Also, it's a snap (literally) to orient the FX 2000 for your most comfortable hand position: Simply pull up on the stick and reseat it to the best angle. Although I didn't need the topside fire buttons or the auto-fire switch for this game, if you favor flight simulators or shoot-'em-up games, you'll love them.

Trust Him You Can

If, on the other hand, your sense of adventure exceeds your dexterity, ditch the joystick and let your mouse and keyboard guide you through a role-playing fantasy game. A current favorite is Strategic Simulations' The Summoning, which drops you into a universe that requires skill with sharp-edged weapons and the mystical forces of wizardry. Unfortunately, to appreciate The Summoning's magical kingdom fully, you'll have to spend far too much time reading screen after screen of pulp-fiction dialogue, in which characters say things like "Trust him you can," instead of "You can trust him."

And yet, there's something about The Summoning that makes it irresistibly amusing. It's not the plot or the characters, which are built from standard parts. It's certainly not the graphics, which seldom surpass comic-book quality. Maybe it's the surreal setting, with a random assortment of talking skulls whose comments are almost entirely meaningless. Or the realistic special effects during combat. Whatever the reason, I found myself returning to The Summoning long after I completed my review—sheerly for fun.

While most of the action takes place in sewers, labyrinths, mazes, and subterranean corridors, you'll find yourself

By Michael Goodwin

IN THE SUMMONING, YOU CAN CONTROL MAGIC with mystical hand gestures. Once you've crafted a spell, it transmigrates into a blue gem (lower right), ready to be cast at your command.

gazing down at the scene from just over the shoulders of the participants. And moving your viewpoint character is a snap. Simply point out your path with the mouse, and the ultraresponsive interface causes the character to follow. It's even easy to zigzag around obstacles—a rare treat in this sort of game.

The Summoning's designers have avoided tedious Use, Look, and Take commands. If you see something you want, simply stand on top of it and click; it goes right into your stash. If you want to use something, just hold it in your left hand and special icons appear. Hold a potion, and you'll see a Drink icon; if it's a weapon, you'll see various Attack icons.

While the program's interface is ingeniously designed, it has its drawbacks. You've probably got all sorts of useful stuff in your pack, but you can't open the pack without holding it. Since you're permitted to hold only one thing at a time in each hand, you'll need to drop your weapon in order to open the sack. More than once, I was killed when I ran out of hands trying to juggle sacks, potions, and weaponry.

You'll need to get up to speed fairly quickly, too, because the bad guys in The Summoning are tough, and they're looking for you. And you'd better settle in for a long quest, because there are at least 24 levels, along with teleportation terminals that send you to uncharted realms. Best of all, this is a nonlinear game with many different paths and possible endings, so once you've got your martial arts down, you can start all over for a different adventure.

- **World Circuit** $59.95; MicroProse Software; 410/771-1151
  Reader service no. 761
- **FX 2000 flight control joystick** $39.99; Suncom Technologies; 708/647-4040
  Reader service no. 762
- **The Summoning** $59.95; Strategic Simulations, Inc.; 800/245-4525
  Reader service no. 763

Michael Goodwin is a contributing editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).* ■

COMING UP

- **The Brave New World of Windows NT**

Our 25-page special report gives you all the information you need to decide if NT is right for your business. We test NT machines running on Pentium and other powerful chips, scope out NT applications, and explore how well your current peripherals will work with this powerful new operating system.

- **Windows Accelerators for $150 and Up**

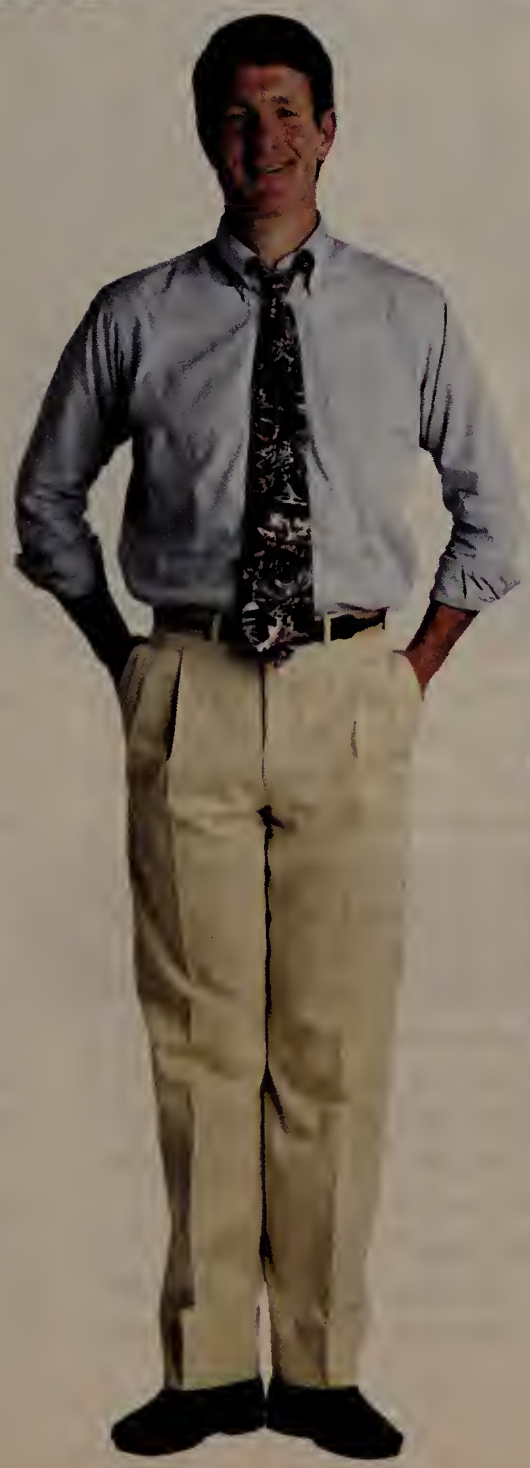
Why settle for slow-as-molasses Windows performance when a graphics accelerator can give you a significant speed boost for a cool price? PC World Test Center experts put 17 VESA local bus and ISA boards through the wringer in a quest for the best deal in town.

Plus:

- **Our Annual User Group List**
- **Online Services: A Treasure Chest of Information**
- **Launching a Home Business**
- **Tips on DOS 6.0, WordPerfect, Paradox for Windows, and more!**

PC WORLD

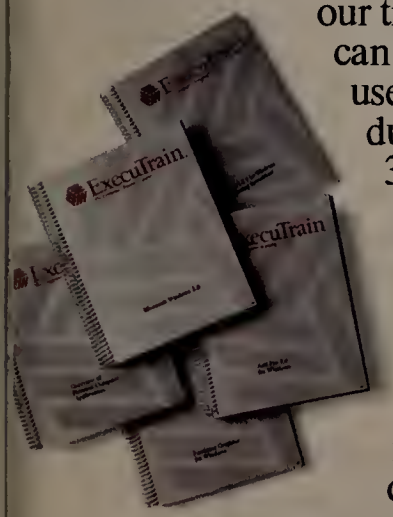
The Best Way To Upgrade Your Computers: Upgrade Your People.



You spent a lot of money putting computers on people's desks. And you've probably spent a lot more on software and hardware upgrades. Yet if your company is typical, you've seen little in the way of productivity gains, because your people lack the training to use more than about 10% of their computers' capabilities.

So consider making your next technology investment where it can provide the greatest return–in courses from ExecuTrain, the computer training leader. Independent research has shown that just one day of our training can increase user productivity 30% or more.

Independent studies of ExecuTrain clients show one day of training can improve productivity 30%.

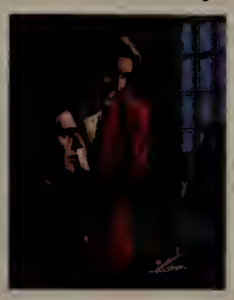


We teach more than 150 courses, presented in simple, easy-to-grasp concepts.

Our instructors are first and foremost communicators–by nature and by training. Our courseware presents concepts in plain English, not computerspeak. And classes are limited to about ten students, ensuring personal attention. We also offer free unlimited telephone support for students. And a money-back guarantee.

With more than 70 locations worldwide, ExecuTrain can provide training for one office or a farflung organization. We can create customized training courses for your proprietary software. And we can even bring our courses into your offices.

We offer a money-back guarantee and unlimited phone support for students.



ExecuTrain instructors are experienced professionals who know how to communicate with students.

So call today for your free People Upgrade package. And before you upgrade your company's computers with more RAM or the latest version of your spreadsheet program, consider upgrading the most important part of your systems: your people.

ExecuTrain.
The Computer Training Leader

1-800-535-9479

©1993, ExecuTrain Corporation. All rights reserved. ExecuTrain and the ExecuTrain logo are registered trademarks of ExecuTrain Corporation.

Circle 82 on reader service card

Making Windows Better

Sure, you've switched to Windows, and maybe you even like it. But aren't there days when you say, "I wish Windows could..." Well, with a little help, Windows can. I've found some ingenious—and cheap—utilities out there that make my Windows sessions easier and make me more productive. And the best part? They're all shareware—you can try any of the products here for the price of a download.

But first let me explain the ground rules: With shareware, you're expected to pay a registration fee if you continue to use the software. (One of the programs here is actually free.) CompuServe and America Online subscribers will find all these programs on the PC World Online forum. (See the sidebar "Shareware at Your Service" in "Instant Payback Software" for other ways to acquire shareware.)

Great Little Programs

Do you ever have too many windows on screen to find what you're looking for? You won't with Auto-Raise, which can easily send your front window to the back, revealing the ones behind it. What's more, you can switch programs without clicking—just hold the mouse over the window or icon and wait a millisec (or longer if you choose). It's the quickest way I've found to switch between applications. • *Auto-Raise $10; Robert F. Nee; 201/798-1344. Available online as AR116.ZIP.*

High on my list of handy utilities is Plug-In, a program that doesn't replace Program Manager but makes it reasonable to work with. For example, Plug-In lets me replace Program Manager's dull folder icons with others of my choice so I can identify a folder by sight (isn't that what icons are all about?). The program also automates installation of new applications by looking for—and running—SETUP or INSTALL programs on floppy drives. Hot keys allow me to minimize my program groups or bring up the Run command box in a flash. And speaking of the Run box, it now remembers the last 25 commands I've given it, saving a slew of keystrokes. Custom cursors for the pointer and hourglass are available, and there's an on-screen display of my system resources with an alarm to warn me when I'm running low. • *Plug-In $20; Plannet Crafters; 404/740-9821. Available online as PLUGIN13.ZIP. Reader service no. 639*

The Windows File Manager is okay, but I used to envy Mac-using friends with their little trash can. Well, now I have one of my own. Trash Manager's icon sits at the bottom of my screen waiting for me to drag and drop unwanted files. And it's safe—Trash Manager won't erase files until I explicitly ask it to empty itself. • *Trash Manager $25; CheckBox Software; 908/545-3010. Available online as TRASHM.ZIP. Reader service no. 640*

Would you use your video card's 1024 by 768 resolution if only you could read the icon titles? Are you sick of the Windows help engine's ugly shade of green? With More Control, you can change your icon's fonts, adjust Help's colors, and make over a dozen other system modifications. More Control is free—there's no registration fee—but for $12.50 you can get a more powerful version with a handy INI file editor, a restart Windows button, and a module to add apps to the Control Panel. • *More Control; Sloop Software; 719/260-0433. Available online as MORECN.ZIP (freeware) and MCICLB.ZIP (shareware). Reader service no. 641*

In the past, I'd have to drop to a DOS box to manage ZIP, LZH, and ARC files. But with WinZip, I get to view, run, extract, add, delete, and even check files for viruses—all by dragging and dropping. WinZip lets me archive files by dragging and dropping from File Manager, and restore files by dragging and dropping from WinZip. It can even create a temporary directory and Program Manager group to let me try an extracted program. You can even drag a file from WinZip to an application. WinZip is just a front end—you still need an archive program. Still, it's pretty handy. • *WinZip $29; Nico Mak; 800/242-4775, 713/524-6394 (orders only). Available online as WINZIP.ZIP. Reader service no. 642*

I admit it: I tend to collect duplicate files. When I ran CleanUp for Windows, it discovered I was wasting about 4MB of hard disk space with duplicate and similar files. This Kirby Vacuum Cleaner of Windows is adroit at ferreting out duplicates and letting me view, tag, and delete them. • *CleanUp for Windows $29.95; Foley Hi-Tech Systems; 415/882-1730, 415/882-1733 (fax). Available online as CLUPW1.ZIP. Reader service no. 644*

Contributing Editor Steve Bass is the president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 12 for contact information).

GLENN MITSUI

By Steve Bass

THE GATEWAY TO THE HOTTEST PC TECHNOLOGY ISN'T GATEWAY.

DELL DIMENSION XPS.
PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

DELL. T
GATEWAY TO
PC TECH

DELL DIMENSION™ 486/33
i486™ DX 33MHz SYSTEM

$1,799†

- BUSINESS LEASE: $67/MO.
- 4MB RAM
- 64MB MAX RAM
- 230MB (17ms) HARD DRIVE
- UPGRADEABLE PROCESSOR
- 6 16-BIT ISA EXPANSION SLOTS AVAILABLE
- ACCELERATED LOCAL BUS VIDEO
- ULTRASCAN 14C MONITOR (14," 1024 x 768, .28mm, NI)
- COMBO DISKETTE DRIVE (3.5" AND 5.25")
- 101-KEY KEYBOARD
- MS-DOS® 6.0/MICROSOFT® WINDOWS™ 3.1/MOUSE

† *Promotional price expires 9/30/93.*

DELL DIMENSION XPS 450V
i486 DX2 50MHz SYSTEM

$2,199†

- BUSINESS LEASE: $81/MO.
- 8MB RAM
- 64MB MAX RAM
- 230MB (17ms) HARD DRIVE
- 128KB EXTERNAL CACHE
- UPGRADEABLE TO PENTIUM™ OVERDRIVE™
- 6 16-BIT ISA EXPANSION SLOTS AVAILABLE, 1 ON VL-BUS
- VL #9GXE VIDEO CARD
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15," 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE
- 101-KEY KEYBOARD
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

DELL DIMENSION XPS 450V
i486 DX2 50MHz SYSTEM

$2,498†

- BUSINESS LEASE: $92/MO.
- 8MB RAM
- 64MB MAX RAM
- 340MB (17ms) HARD DRIVE
- 128KB EXTERNAL CACHE
- UPGRADEABLE TO PENTIUM OVERDRIVE
- 5 16-BIT ISA EXPANSION SLOTS AVAILABL 1 ON VL-BUS
- VL #9GXE VIDEO CARD
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15," 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE
- 101-KEY KEYBOARD
- MULTI-SESSION, DOUBLE-SPIN CD ROM DI
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

DELL DIMENSION XPS. PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

Now that you've witnessed the sheer technological superiority Dell wields over Gateway, there are only two decisions you have left to make.

Which Dell Dimension XPS PC is right for you?

And what kind of software would you like to go with it? Whatever it is, we can help out.

That's right. You can order your software at the same time you order your Dell Dimension XPS. That way, you'll be up and running right out of the box.

Purchase your favorite combination from 100 of th most popular and competitively priced DOS and Windows applications and have them pre-loaded onto your machine for one low $15 installation fee.

And should you ever want to add a peripheral, upgrade a software package

intel inside

*Prices valid in the U.S. only. Some products and promotions not available in Canada. Leasing arranged by L Group, Inc. The Intel Inside logo is a registered trademark and i486, Pentium and Overdrive are trad

E REAL
THE HOTTEST
NOLOGY.

L DIMENSION XPS 466V
6 DX2 66MHz SYSTEM

2,799†

- SINESS LEASE: $104/MO.
- AB RAM
- MB MAX RAM
- 0MB (12ms) HARD DRIVE
- 6KB EXTERNAL CACHE
- GRADEABLE TO PENTIUM OVERDRIVE
- 6-BIT ISA EXPANSION SLOTS AVAILABLE, N VL-BUS
- #9GXE VIDEO CARD
- B VIDEO RAM
- RASCAN 15FS MONITOR ," 1024 x 768, .28mm, NI)
- E DISKETTE DRIVE
- KEY KEYBOARD
- LTI-SESSION, DOUBLE-SPIN CD ROM DRIVE
- DOS 6.0/MICROSOFT WINDOWS MOUSE

DELL DIMENSION XPS 466V
i486 DX2 66MHz SYSTEM

$2,999†

- BUSINESS LEASE: $111/MO.
- 16MB RAM
- 64MB MAX RAM
- 450MB (12ms) HARD DRIVE
- 256KB EXTERNAL CACHE
- UPGRADEABLE TO PENTIUM OVERDRIVE
- 5 16-BIT ISA EXPANSION SLOTS AVAILABLE, 1 ON VL-BUS
- VL #9GXE VIDEO CARD
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15," 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE
- 101-KEY KEYBOARD
- MULTI-SESSION, DOUBLE-SPIN CD ROM DRIVE
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

DELL DIMENSION XPS 466V ULTIMATE
i486 DX2 66MHz SYSTEM

$3,198†

- BUSINESS LEASE: $118/MO.
- 16MB RAM
- 64MB MAX RAM
- 450MB (12ms) HARD DRIVE
- 256KB EXTERNAL CACHE
- UPGRADEABLE TO PENTIUM OVERDRIVE
- 5 16-BIT ISA EXPANSION SLOTS AVAILABLE, 1 ON VL-BUS
- VL DIAMOND VIPER VIDEO CARD
- 2MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15," 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE
- 101-KEY KEYBOARD
- MULTI-SESSION, DOUBLE-SPIN CD ROM DRIVE
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

rder a new application, we can help you there too. h DellWare.™ A selection of over 2,400 software and pheral items that you can order direct from us at ount prices. And if you want your DellWare ctions in a real hurry, we'll ship your order to you night for only $5 extra. For no charge at all, we'll you a free DellWare catalog. Packed full of software peripheral products for you to choose from. nd when your catalog arrives, you can spend a leisurely afternoon looking at some more techie goodies that Gateway doesn't have to offer you.

DELL™

TO ORDER, CALL

800-765-5785

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT

IN CANADA, CALL 800-668-3021. PLEASE REFERENCE **#11DBN**

Co MS-DOS and Microsoft are registered trademarks and Windows is a trademark of Microsoft Corp. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corp. All rights reserved

THE FASTEST VIDEO ON PLANET EARTH.

Super fast double-spin CD ROM drive.

450MB local bus IDE hard drive.

Five available expansion slots that let the 466V Ultimate expand to meet your wildest ambitions.

For just $199 you can add two amplified, full-powered Labtec CS550 stereo speakers and a 16-bit Soundblaster stereo CD-quality sound card to your Dell Dimension XPS 466V Ultimate.

The Viper board is available as an upgrade from Gateway, but the Dell Dimension XPS 466V Ultimate certainly is not.

It ships with 16MB. It can be stuffed with up to 64MB. It is one fast machine.

Enhanced, space-saving 101-key keyboard.

60 MILLION WINMARKS

*The Viper Video Card. At 60 million WINMARKS,** it's the fastest PC graphics accelerator on planet Earth. Stock equipment on the Dell Dimension XPS 466V Ultimate.*

intel inside

DELL DIMENSION XPS. PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

If you've been bitten by the speed bug, sink your teeth into our Dell Dimension™ XPS 466V Ultimate. A blistering fast 486 rocket.

Featuring the Diamond Viper VL video board configured with 2MB video RAM, (the fastest PC graphics accelerator board on planet Earth) this speed demon is the perfect solution for color publishing, multimedia and high-end graphics applications.

Thanks to the Viper, the 466V Ultimate features a virtually flicker-free display at all resolutions. You can work with a palette of up to 16 million brilliant colors. For added speed and performance, the Viper comes with its own turbo drivers to drive all of your Windows™ 3.1 applications even faster. Oh and before we forget, the Viper has 2 megabytes of its own VRAM for the kind of face-warping acceleration that leaves others blinking in the dust.*

The 466V Ultimate comes fully decked out. With 16MB of RAM upgradeable to 64MB. A 450MB local bus IDE hard drive. High speed 256KB static RAM external cache. Five available 16-bit expansion slots — one of which can support an additional high-speed VL device. A 15-inch UltraScan™ 15FS non-interlaced monitor with 1024 x 768 pixel display. One internal diskette drive. Our double-spin CD ROM drive. Configured with MS-DOS® 6.0, Windows 3.1 and of course, a mouse.

All for just $3,198 (Business Lease◊: $118/MO.).

You can order one today from Dell. And get the ultimate in performance.

DELL™

TO ORDER, CALL

800-283-0088

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT

IN CANADA, CALL 800-668-3021. PLEASE REFERENCE **#11DJ3**

**Dell assumes no responsibility for face-warping acceleration injuries. **Performance measured by running WinBench version 3.11 at 1024 x 768, 256 colors.*